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September 11, 1950

STEEL

The Magazine of Metalworking and Metalproducing

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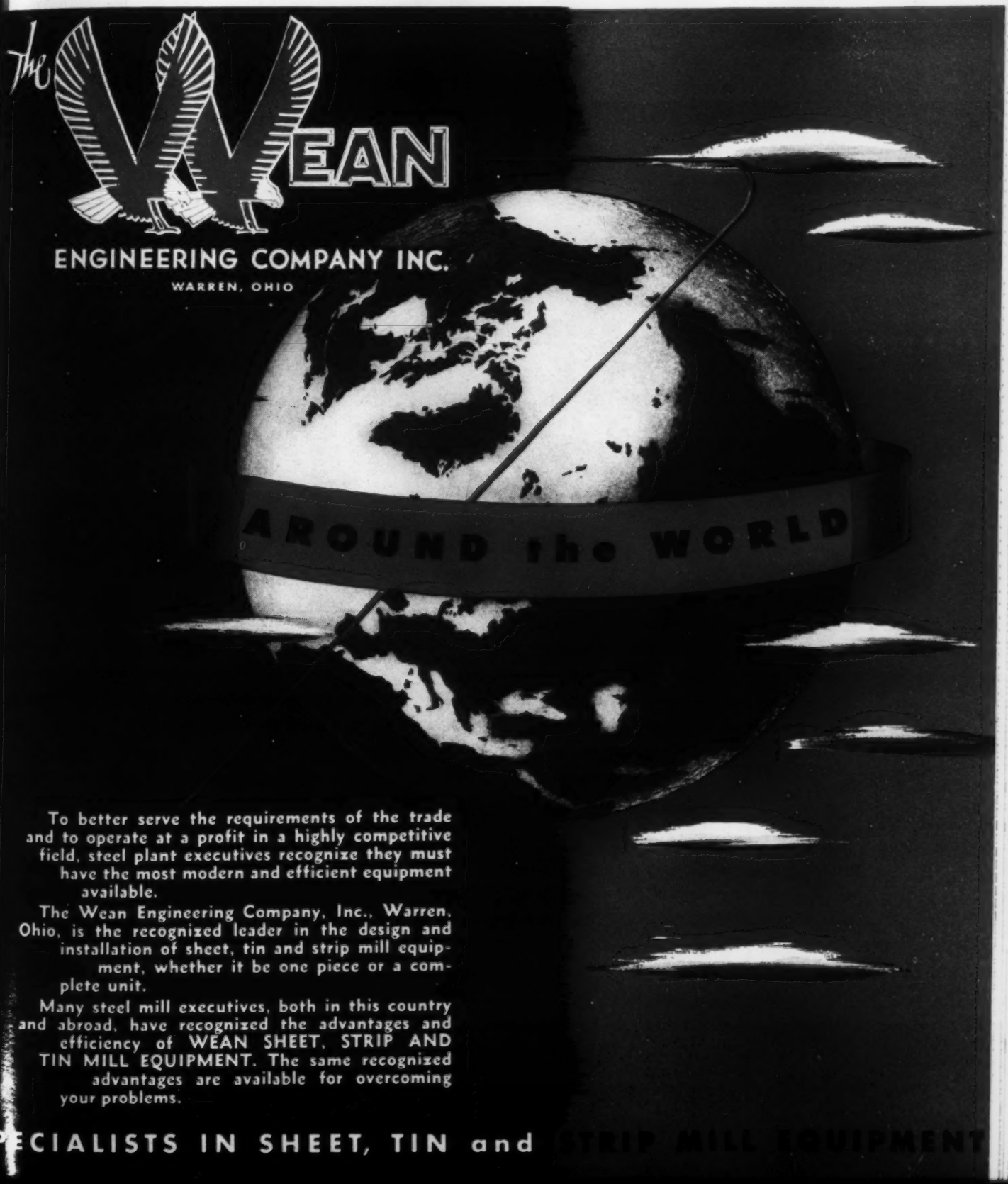

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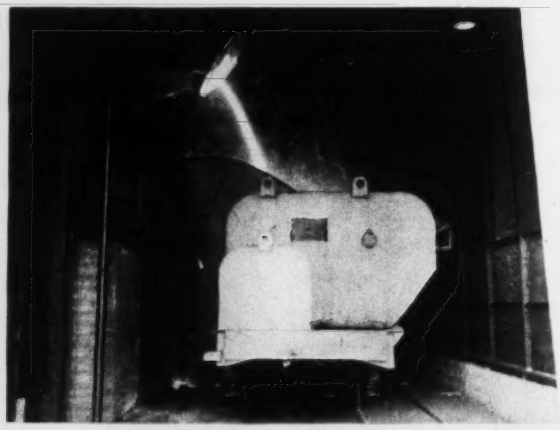
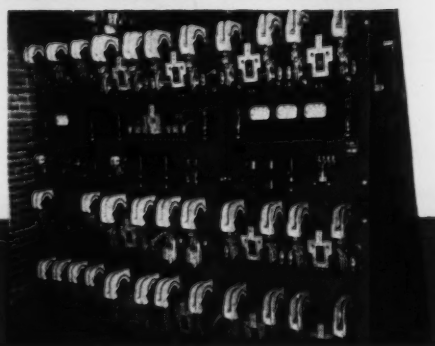


Hot metal mixer pouring into hot metal car, both of which are operated by EC&M Control.

EC&M power-circuit type Limit Stops mounted on hot metal mixer (shown above), provide positive slowdown and final stopping.



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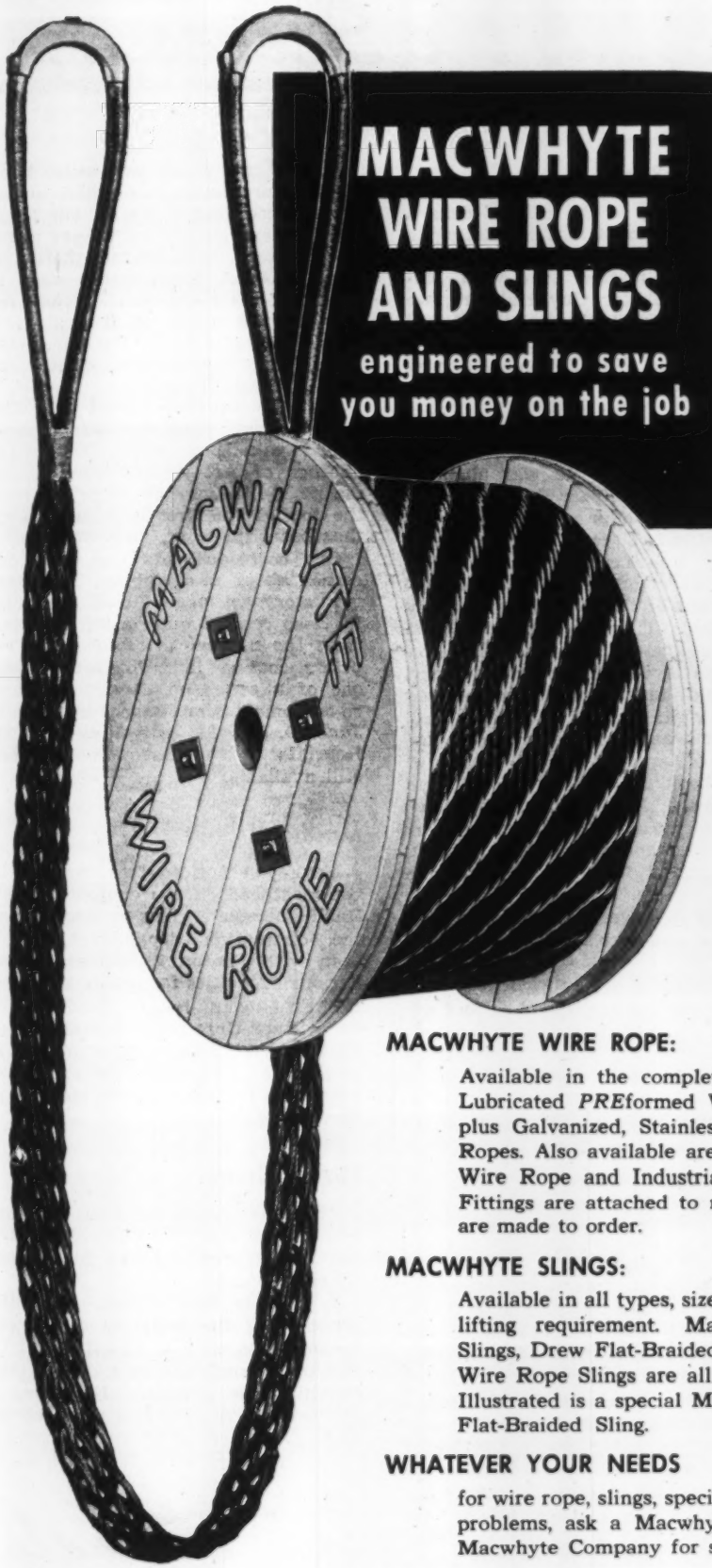

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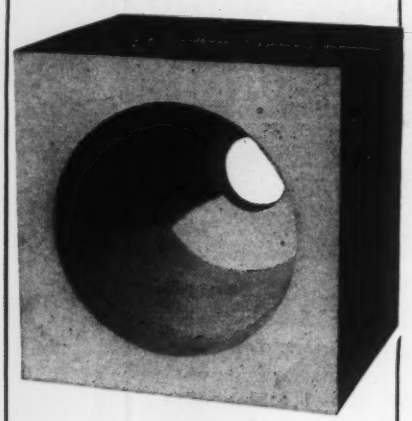

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Behind the Scenes . . .

Explosive Book

We were up in the editors' dens a few days ago on a matter relating to German machine tool builders. In talking the matter over with Machine Tool Editor Guy Hubbard, we discovered that he knew a good deal about German machinery and that during World War II some information he had was a godsend to our Air force.

"It all dates back to 1926," said Guy, digging out a musty volume from his archives. "I was planning to go to the Leipzig Fair and was hunting around for some background information. I went to the German Railway Information Office in New York that about ten years later got kicked out of the U. S. as an agency for Hitler. They gave me this book. If Adolf knew the damage this volume was to do his German industry, he would have kicked the Railway Office right out of Germany, too, when it was sent packing from the U. S.."

The book is a directory of Verein Deutscher Machinenbau - Anstalten (German Machinery Manufacturers Association). Guy's trip to Leipzig didn't pan out, but he kept the volume as a curiosity. Some of the people he knew in government learned that he had it and asked to borrow it when World War II broke out. It was returned in 1946.

The directory gave names and addresses of every important machinery manufacturer in Germany, described the product and the manufacturing plant.

It came in handy when the U. S. started its pin-point bombing of German industry.

Niff-Nawing

Correspondence we've received in the past week has dealt primarily with two subjects—hassle and re-equipment. Hassle, because of our discussion of that word in our Aug. 14 column. Re-equipment, because of the article Associate John Morgan wrote on the subject Aug. 21.

You'll remember that a few weeks ago we were chiding the editors upstairs for not taking a chance on "hassle" which Detroit Editor Art Allen wrote in his column. They couldn't find it in any reference books, so blue-penciled it out. We thought it had a fine sound and must have been in circulation somewhere sometime. According to one of our feminine readers, our instincts were right. She writes: "Of course there's a word 'hassle.' Shakespeare used it in one of his plays . . . . I can't remember the name of it . . . . a couple of years back. Such a lovely word, and the editors deleted it. Such a hassle indeed."

We're pleased to report that the editors have learned their lesson. Last week they didn't blue-pencil another of Art Allen's teasers. In the Sept. 4 issue on page 70 near the top of the first column appears that beautiful word, "niff-nawing."

Our correspondents are also concerned about re-equipping. The Morgan story on page 70 of the Aug. 21 issue created quite a stir, judging from the number of requests for reprints coming in. The article was one of a series on depreciation and re-equipment that have run May 8, June 19, July 31, as well as Aug. 21. Reprints of the last two only are still available.

Masthead Shift

Have you noticed two changes in the masthead on the contents page? Rand Ebersole is the new manager of the circulation department. He's been with Penton Publishing Co. in various capacities for nearly 22 years. Ed Franke, a recent graduate of Ohio State University, is manager of the Readers' Service department. If you have a question about when STEEL ran its last story on steel wool, pose it to Ed.

Puzzle Corner

The swimmer in the Aug. 28 problem should start to swim due East, but the current makes his actual course 239 deg.

A gun is held 4 feet from the ground. If the bullet is discharged horizontally with a velocity of 2000 feet per second, how long does it take to strike the ground? How long if the velocity is 4000 feet per second?

Shrdlu

(Editorial Index—page 51)

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STEEL

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***Next Week*... Efficiency, Production Developments Keynote Iron and Steel Engineers Meeting... A Decade of Steelmaking Developments... Modified Submerged-Arc Process Lowers Welding Costs... How to Choose Blast Furnace Refractories—Conclusion.**

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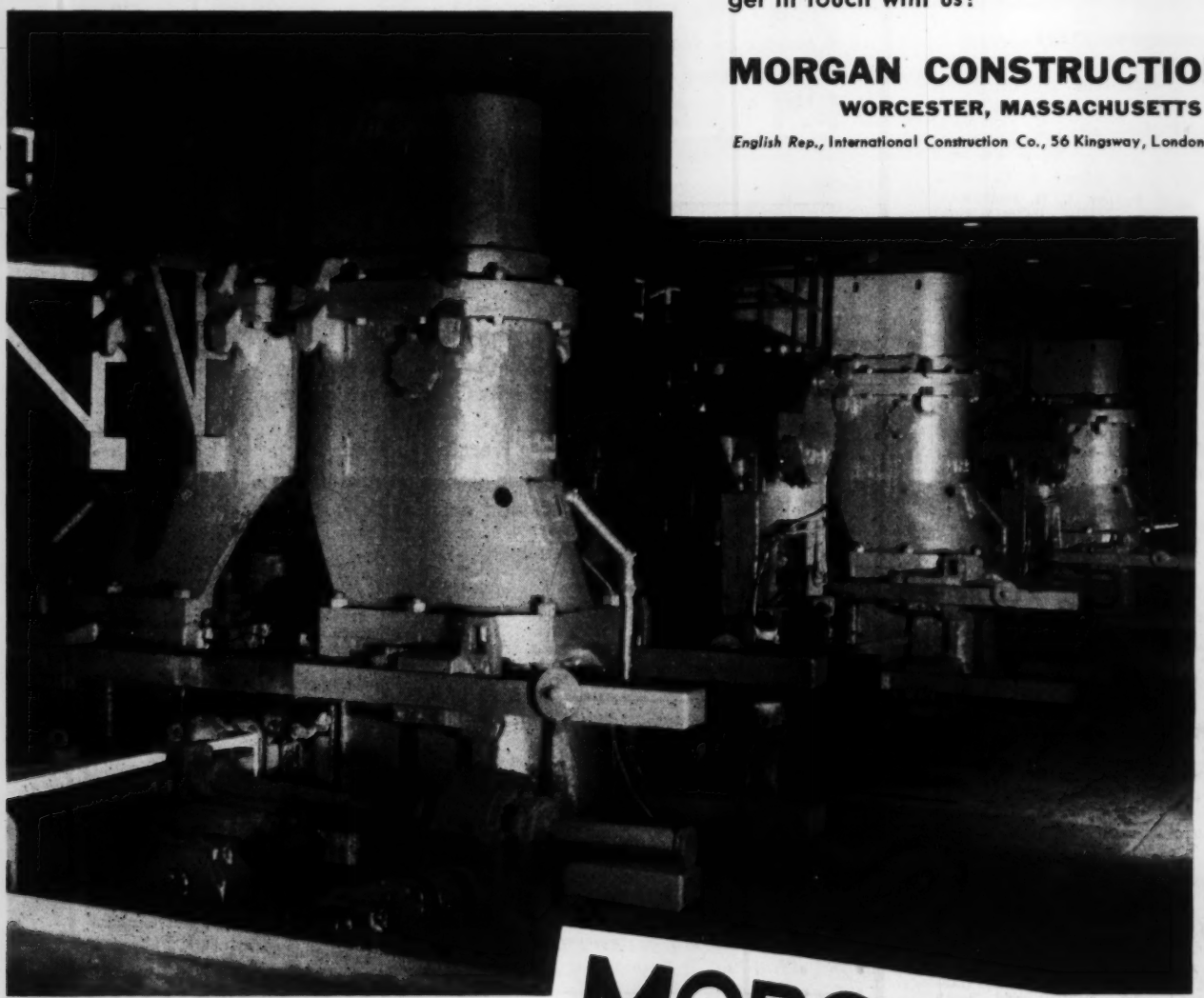

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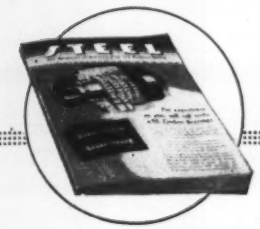

September 11, 1950

Challenging Outlook

Two weeks ago we quoted a small steel consumer who, denied steel from his mill sources, declared that he was favorable to the idea of the government going into the steel business so that consumers in a plight similar to his could remain in business. We commented that if everybody turned over to Uncle Sam his temporary problem of steel supply, the end result—government ownership—would do more harm than good.

As expected, the editorial has elicited a number of letters from other consumers who are suffering seriously because they cannot obtain enough steel to operate profitably. The most bitter complaints come from two classes of consumers—first, those who have no "prewar pattern" of steel purchasing and, secondly, those whose current steel requirements are two or three times those of their "prewar pattern." Apparently there are a substantial number of these hardship cases and they are of sufficient gravity to warrant more attention than has been devoted to them up to this time.

Aside from whatever temporary relief could be afforded by possible changes in the manner of allocating steel to customers or by importing European steel, the main hope under present conditions for more adequate supply lies in expansion of steel capacity. Steel producers have done a commendable job in increasing ingot capacity from 91 million tons in 1947 to over 100 million tons today. They have expansion programs under way which will swell capacity to 105 million tons by the end of 1952.

Under ordinary circumstances this would seem to be sufficient. Remember how rapidly backlogs of orders melted early in 1949 and how nearly we came to experiencing a buyers' market. A revival of purchasing in anticipation of the steel strike interrupted the trend toward an easier steel supply. Since then, one crisis after another has prevented the mills from catching up on demand, despite production at unprecedented volume.

Today our global commitments, sharply expanded and intensified by the Korean situation, force us to the conclusion that we cannot expect "ordinary circumstances" for many years to come. Apparently we must live in a continual state of crisis for an indefinite period.

We should re-examine our problem of steel demand and supply in the light of this new challenging outlook.

* * *

HANG ON TO GOOD MEN! Department of Commerce estimates the number of gainfully employed persons in August at 62,367,000. This is the largest working force in the nation's history. The number of unemployed fell from 3.2 million in July to 2.5 million in August. This is the smallest army of jobless since early in 1949.

These figures reflect the over-all employment situation but do not indicate the acute scarcity or unbalanced geographical distribution of certain classes of skilled workers. Newspapers in many eastern industrial areas are carrying display and classified advertisements for midwestern and farwestern aircraft manufacturers who are seeking skilled craftsmen. The response to these and other offers for good employment in plants that obviously are or will be engaged in war work is somewhat illuminating.

For instance, when a tank builder advertised

(OVER)

for about 6000 employees, more than 8000 applied for jobs. Of these applicants, about a third already had satisfactory jobs but apparently were looking for something definitely tagged as essential war work. Another third were men and women who had retired from work in war plants after World War II.

Resistance to "raiding" differs among plants in the metalworking industries. In spite of the feast and famine proclivities of the machine tool industry, its working personnel seems to possess a loyalty not found among skilled artisans in some other industries.

Now is a good time to hang on to good men. —pp. 78, 94

* * *

THE GOOD OLD DAYS? George Christopher, retired president of Packard Motor Car Co., is one of many top executives in motordom who has advanced to a high position via the route of experience in the machine shop. Recently he has been comparing the conditions of employment in a typical machine shop of 1950 with those of his early days at lathe and bench.

His conclusion is that "as compared with what it used to be, machine shop work no longer is hard work." That is absolutely true. Today's machinist has the advantage of better working conditions, higher hourly compensation and improved equipment which eases manual labor. It can almost be said that he is a pampered pet compared with his prototype of 1910. On the other hand, he has lost valuable prerogatives. The all-around machinist early in the century had a variety and range of work enjoyed by few under today's conditions. —p. 94

* * *

MAJORITY PAID CASH: Statistics of the automobile industry always are interesting and sometimes are spectacular. The latest edition of "Automobile Facts & Figures," annual handbook put out by the Automobile Manufacturers Association, contains some figures that make you open your eyes in wonderment.

No. 1 stopper is that during the past 50 years, United States auto builders have turned out 108,410,635 motor vehicles valued at wholesale at more than $87 billion. This is a significant reflection of the tremendous consuming power of people living according to American standards.

Here is another arresting statistic: In 1949 unprecedented sales of new automobiles were financed chiefly by cash payments. Of all purchasers of motor vehicles, 56 per cent paid cash, 43 per cent bought on the time payment plan and 1 per cent employed other methods of financing. Ponder these percentages carefully. They speak volumes for our system of enterprise which stimulates mass purchasing power.—p. 73

* * *

ALUMINUM HEADGEAR: In the metalworking industries are tens of thousands of executives who served in World Wars I or II and who have sentimental ideas about the helmets that were issued to them as they neared the battle zones. We wonder what their reaction will be to the announcement that if field tests corroborate preliminary tests, aluminum will replace steel as the material for combat headgear.

The aluminum helmets have a plastic liner, as did the standard steel helmet. Unlike the steel headpiece, the aluminum headgear depends upon the plastic liner for resistance to shell fragments. The liner is said to afford as much protection as the steel shell and liner of the orthodox helmet.

Doughboys probably will judge the new headpiece on the basis of its collateral uses. How good will it be as a cooking utensil, shaving mug or water bucket? Also will it be any good as an emergency trench shovel in scraping out a fox hole when the going gets really tough? —p. 69

* * *

REDUCES SCRAP LOSS: Now that the nation is approaching another spurt of production for the military, industry will be alert for new methods that will cut costs, save time or conserve materials. Companies which will be in line to receive contracts for cartridge cases for small arms will do well to look into the advantages of producing these cases from extruded brass rod instead of from blanking from brass strip.

The process of extruding cases from round stock is not new. A French company made hundreds of millions of cases by this process prior to World War II. Named the Manurhin process, the procedure is to employ backward extrusion on a slug sheared from brass rod. One great advantage is that loss of brass in the Manurhin process is 0.3 per cent compared with 34 per cent when cartridge cases are made by blanking brass sheets. Another advantage is that cases made by the Manurhin process have greater uniformity of wall thickness. —p. 88

E. L. Shaner

EDITOR-IN-CHIEF

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News Summary

THE STRIDE LENGTHENS—Uncle Sam is stepping up the pace of military and industrial mobilization. Three million people in the armed services will require a lot more equipment and materiel than 1.5 million. The Munitions Board now estimates steel requirements for military purposes in the year starting Nov. 1 will be 4.1 million tons, double that used in the fiscal year ended June 30 (p. 59). Today's estimate of military requirements may seem puny tomorrow.

DEFENSE CONTRACTS—More companies are receiving contracts to supply military needs. The Defense Department says it will go over war contracts with a fine-tooth comb. Fixed-price contracts will be used wherever practical. Adequate profit margins will be allowed, but contingency allowances and escalator clauses will be watched carefully. The department is proceeding on the theory that closer control over prices at the outset will ease the problem of renegotiation and of enforcing general price, wage, and other stabilization controls (p. 60).

OUTPUT GOING UP—Superimposition of a heavier defense production on the already great civilian output will test the strength of industry in the months to come. Recent records will be topped. The auto industry (p. 73) anticipates passenger car and truck outturn will exceed 8 million units. Steel, of course, will press capacity. The Korean war has alleviated the soft coal industry's overproduction problem. Take most any other line—it's busy.

AND LABOR TOO—Employment hit an alltime peak in August with more than 62 million employed (p. 78). Manpower is at a premium. This is reflected in the comparative ease with which large segments of metalworking labor have obtained substantial wage increases. Those who have not received increases are making demands or soon will make them (p. 61) to get under the wire before wage controls are established. Continuing inflation is indicated; wholesale prices are 9.3 per cent higher than a year ago (p. 78).

LIFO—Speaking of inflation, have you considered the last-in, first-out method of inventory accounting? It may offer a hedge against price increases (p. 62).

MANGANESE FROM HOME—Domestic manganese development is again receiving considerable attention in Washington (p. 66). The Mills bill would provide premium payments for domestic manganese ore which would bring the price to about double that paid for imported ore. The House Appropriations Committee has approved another bill providing for a pilot plant to process low-grade ore in Arizona and also providing funds to push development of a process for reclaiming manganese from open-hearth slag.

IMPORTS-EXPORTS—Western European countries are increasing shipments of goods to this country while United States exports to ECA beneficiaries is declining (p. 70). The result is a little easing in materials shortages in the United States.

HERE AND THERE IN INDUSTRY—Allegheny Ludlum Steel Corp. is building new electric furnace capacity at Watervliet, N. Y., to produce 80,000 tons of such metals as stainless valve and high-temperature steels adaptable for defense uses . . . Newport Steel Corp. (p. 65) is under new top management . . . Sheet Mills Inc. is resuming operations at the Indianapolis rolling mill formerly owned by Chapman-Price (p. 64), may produce 5300 tons of flat-rolled products monthly . . . Second Bureau of Mines gas-synthesis plant will start operations at Louisiana, Mo., early next year (p. 69) . . . Automobiles still are older than in prewar days (p. 73); gasoline consumption is up 33 per cent . . . Materials procurement is today's major problem for the truck-trailer manufacturers (p. 79); when allocations come, they want to be represented among beneficiaries . . . Two dozen foreign trade fairs, mostly in Europe (p. 70), may suggest new sources of supply.

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Here at Ryerson we're making an all-out effort to ease your steel-buying problems as much as possible.

No, we can't deliver all the steels you may need. Critical shortages growing out of the international situation prevent that. But what we can do—what we *are* doing is working shoulder-to-shoulder to see that you get every *available* item required as quickly as we can get it to you.

In spite of unbalanced stocks, we still have fairly good overall tonnage on hand. And the services of our experienced specialists may prove highly valuable in determining alternates, when the steels you need aren't readily available.

So for any kind of steel—any time—contact your nearby Ryerson plant. You can be sure we'll do our level best to take care of you.

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STAINLESS—Allegheny bars, plates, sheets, tubes, etc.
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STEEL
A PENTON PUBLICATION

Mobilization Goals Raised

They have to be to support an armed force to be doubled to 3 million people. In metalworking, fabricators will probably feel the pinch more than steel producers

INCH-by-inch industrial mobilization will have to accelerate to a foot-by-foot or yard-by-yard pace if we are to double the number of people in the armed services to 3 million.

Military ordnance people point out that if the services are doubled a massive re-equipment order would be inevitable to support such a force. Large equipment orders would be needed to maintain even the current 1.5 million men and women.

Creeping Obsolescence — Present Army equipment is almost all of World War II vintage. The average age of Army transport is six years. Normally, vehicles are pulled out of service at the end of their fifth year, but the Defense Department has been economizing until recently. The Army is also in rather poor shape for artillery.

The major weapon is still the 105-mm gun which is ineffective against even Russian medium tanks. Special weapons such as the 3.5-inch bazooka must also be produced in quantity. Hitherto, they have been in the experimental class. The first of the weapons to be used in the field were flown to Korea in August.

The latest Munitions Board estimate of total steel to be required for military purposes in the 12 months starting Nov. 1 is 4.1 million tons of finished products or about double the tonnage consumed by the military in the fiscal year that ended last June 30.

Predominating requirements will be shell steel, seamless tubing for rockets, light rolled and heavy cast armor plate and sheets and strip for landing mats.

Practically Painless—The steel industry probably will be able to superimpose additional military demands on all current civilian needs without acute discomfort except for sheet and strip and certain sizes of seamless tubing. The 4.1 million ton estimate embraces only the domestic program and not the Atlantic Pact considerations. Not only will the Atlantic Pact program be considerably smaller but the bulk of the steel for it will be furnished by European mills so that the burden of American producers will not be heavy.

Mobilization: Foot on the Gas

The burden of military and foreign aid commitments may hit the hardest those metalworking producers who are not steelmakers. Steel men need not tool up for defense, nor do they generally have the research problems facing machine tool builders, truck manufacturers, aircraft producers, etc.

Before the Fact — Research and tooling problems are already occupying many metalworking producers even though they have not yet begun volume production of the hundreds of thousands of industrial and military equipment items inevitably needed now that the armed forces are going to be expanded to 3 million men and women.

Before all these equipment contracts can be placed, more appropriations probably will become necessary.

To date military and foreign aid appropriations granted and on which action is pending total $33.3 billion. That sum doesn't include the money needed for the expansion to 3 million in the armed forces. Of the $33.3 billion, $13.3 billion has been approved for the military establishment, $3.1 for the Marshall Plan and $1.3 billion for foreign arms assistance. Supplemental requests by the President on which action is pending include $3.3 billion for the Army, $3.8 billion for the Navy and $4.5 billion for the Air Force. No action has been taken on a request for $4 billion in emergency arms aid.

Who Administers What in Defense Production?

THE NEW National Production Authority and other agencies concerned with the Defense Production Act of 1950 were hampered in their planning last week because of President Truman's unexpected delay in signing the measure.

They knew the provisions of the act, but the question was: Who's to administer the various provisions? NPA will allocate metals, but will the Interior Department handle fuels? The major points of the measure are:

Allocations, Priorities—The President can set up a system of allocations and priorities to channel essential materials into war production.

Production—The President gets a special fund of $600 million for loans to spur defense production. He can also ask for outright appropriations of up to $1.4 billion for similar uses.

Labor—Mr. Truman is authorized to set up a war labor board to settle disputes affecting national defense.

Prices, Wages—The President, who did not ask for powers in this field, is offered three choices. First, he can seek voluntary agreements from labor and industry. Second, he can clamp controls on a single industry, but if he curbs prices in that industry he must also control wages. Third, he can impose blanket wage and price controls on all industry; if he does, he must set up a general controls agency, much like OPA in World War II.

Requisitions — The President can requisition materials or property for defense purposes and can require acceptance of defense production orders.

Credit—Mr. Truman can place controls on installment and other consumer credit and on credit for new real estate construction.

Hoarding — The accumulation "in excess of reasonable demands of business consumption" of any goods specified by the President would be a crime punishable by a $10,000 fine or a year in jail.

Rationing—The President can order rationing of consumer goods. He did not originally ask Congress for such powers.

The final section of the measure

sets up a "watch-dog" committee of Senate and House members to keep the bill's operation under surveillance. The section gives emergency exemption from the antitrust laws for companies where such exemptions are necessary. Priorities and allocations authority, requisitioning power, expansion of productive capacity and supply and general provisions sections have an expiration date of June 30, 1952. The price and wage stabilization, labor dispute and consumer and real estate credit controls all expire June 30, 1951, unless Congress meanwhile votes their extension.

Military Buying Sharpens

Detailed estimates will be required of price components on major contracts

DICKERING for a contract with the Department of Defense? Expect government officials to go over it with a fine-tooth comb.

A first principle of a new military procurement policy now in effect is that emphasis will be placed on types of contracts and contract pricing methods that encourage economy and production efficiency. Adequate profit margins will be allowed as an incentive for efficient performance by contractors. Allowances for contingencies will be eliminated to the greatest extent possible.

Eagle Eye—The policy places close controls over types of contracts to be used. It stipulates that fixed-price contracts will be used without provisions for price redetermination or escalation throughout the Defense Department whenever practical. Incentive-type contracts may be used where dollar amounts are large, production periods long and when reasonably close target prices can be established.

Fixed-price contracts with provision for price redetermination or escalation may be used whenever contingency charges otherwise would be included in a contract price due to such factors as prolonged delivery schedules, unstable market conditions for material or labor or uncertainty as to cost of performance.

Proof Positive — Cost reimbursement type contracts will be limited to cases in which other types of contracts are not suitable, and where the contractor's cost recording system facilitates audit and where close checks can be made during performance of the contract to assure that the contractor is not employing wasteful or extravagant methods.

In general, detailed estimates will be required of price components on negotiated prime contracts and major subcontracts.

The Minimum—Emphasis will be placed in military buying on the prevention of excessive profits through close forward pricing and repricing rather than through recapture of excessive profit by renegotiation. Defense thinks that prevention of excessive profit in advance provides stronger incentive for good performance and stronger support for wartime production, distribution and stabilization controls.

Arizona Plant Blossoms Again

One of Arizona's largest World War II defense plants will be expanded shortly at Litchfield Park. Under a contract between Goodyear Tire & Rubber Co. and the Defense Department, the Goodyear Aircraft plant will manufacture aeronautical parts and metal frames for the U. S. Navy. Several hundred additional employees will be needed to handle the work.

During the war the plant was a modification center for Navy aircraft and turned out aircraft parts. At its peak production it employed about 6000. The plant, a few employees of which are making rubber bags or envelopes for lighter-than-air craft, is tooling up for its new contract.

Federal Purchases Soar on Coast

The Korean war is accelerating federal government purchases of supplies and materials in the San Francisco bay area.

The latest report shows purchases of $4,612,000 in the week ended Aug. 16, more than three times as much as the same July week.

Ekco Sets Up Defense Board

Ekco Products Co., a Chicago firm making houseware goods, has established a defense planning board to expedite possible conversion of all or part of its plants to war production.

A staff of six engineers and two merchandise specialists will devote all their time to the board's work, and Ekco's entire engineering and research staff will be drawn upon as needed. The company has established an office in Washington to study day-to-day government purchases of field-kitchen and fighting equipment and to consult with military procurement officers on anticipated needs.

Defense, Freight Car Orders Help

Recent increase in freight car orders along with military orders has boosted American Car & Foundry Co.'s current backlog to three times what it was on Apr. 30. It now amounts to $134 million compared with $42 million on the earlier date. In addition Charles J. Hardy, board chairman, says bank loans which stood at $5 million on Apr. 30 have been paid off.

Company's backlog consists of 12,654 freight cars and 124 passenger cars. Receipt of a substantial order for tanks was reported in July but the number of vehicles and dollar value of the contract cannot be revealed for security purposes.

NEA

HEART FOR A FIGHTER WING: Discussing an engine replacement for an F-51 with his executive officer and a crew chief is Col. Charles W. Stark, right, commander of a U.S. Air Force fighter wing. Air Force ground crew personnel in the background recondition another F-51 engine

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Wide World

"TEAM" WORK: Flanked by other members of the Ford and UAW-CIO negotiating teams are John Bugas (seated, left), Ford industrial relations head, UAW President Walter Reuther (center) and Ken Bannon, UAW director at Ford. Mr. Bugas is signing the five-year contract that will give 110,000 Ford workers at least eight cents more an hour

Steelworkers Ask Union Shop, Wage Hike

Campaign gets under way against basic steel and aluminum companies to compel workers to join union. Two hundred victories claimed in fabricating plants

UNION-SHOP elections throughout the basic steel and aluminum industries will be sought this fall by the United Steelworkers of America-CIO.

The union will open its drive against the United States Steel Corp. subsidiaries and attempt to extend it through all the other companies. The union's time table calls for elections to be held about Nov. 1.

Union-shop clauses in the labor contract would require workers to join the union as an employment condition.

More Wages, Too—At the same time the steelworkers' union is pushing a drive for another wage increase. Union President Philip Murray served notice on the industry of the approaching wage demands in a Labor Day speech at Birmingham. Earlier, Pittsburgh district steelworkers had voted to demand higher wages when the present contract permits reopening of wage discussions Nov. 1.

Union members also are beating the drums for increased pension and insurance payments, longer vacations and elimination of wage differentials. Industry representatives point out that pensions and insurance provisions are not subject to negotiation this year.

McDonald Tells How—Detailed instructions on the steps to be taken by local and regional union officers for pushing the union shop campaign have been issued by David J. McDonald, union secretary treasurer.

Locals are told that officers must comply with legal requirements by signing non-Communist affidavits and must obtain National Labor Relations Board letters of compliance.

The locals then are asked to obtain cards from members authorizing the union to seek the union shop. Thirty per cent of employees in the bargaining unit must sign such cards before asking for an election. The union will prepare an alphabetical list of names and badge or clock numbers of those signing the cards.

Small Targets—The union is waging a campaign to obtain union shop clauses in contracts with fabricating and processing plants. It claims 200 victories in elections held thus far among the smaller plants.

Elections are scheduled for the American Can Co. soon after the middle of this month. A drive is currently under way at plants of Continental Can Co.

Preliminary Bouts—Although the drive for higher wages has been planned for several weeks, the campaign gained momentum with the winning of substantial wage increases by workers at the larger automobile plants (see p. 73).

The restlessness that usually precedes wage negotiations already is evident in an increase in walkouts for little or no cause. A night shift was lost last week at Great Lakes Steel in what was regarded as a negotiation preliminary.

CIO Turns Down Wage Increase

An advance of 5 per cent in the price of its tapered roller bearings and rock bits was announced by Timken Roller Bearing Co.—effective the first of this month.

The increase follows a boost of 5 per cent in pay for salaried employees and other employees not covered by collective bargaining contracts, previously announced to become effective Sept. 1. A wage increase of the same amount and contract changes were proposed to CIO bargaining units but were rejected.

How To Help Recruit Workers

Three years ago Lyon-Raymond Corp., a materials-handling equipment manufacturer at Greene, N. Y., held an open house on a Saturday afternoon when the plant wasn't operating. This year the company went further: It held a full week of open house while it was operating. Cause of all the celebrating was the 28th anniversary of the purchase of Lyon Iron Works by George G. Raymond, president of Lyon-Raymond. The company invited the townsfolk to come in and look it over.

Every employee who had served five or more years had a sign at his machine, work bench or desk, giving his name and length of service. The celebration also served as a recruiting effort in attracting desirable employees.

Western Employment Increases

Industrial and commercial employment on the West Coast in September is expected to reach its highest level since the peak of the last war.

The latest available statistics, those for Aug. 1, showed an addition of 48,000 workers to payrolls in July, bringing employment to 4,235,000 on Aug. 1, a figure only 100,000 below the postwar high established in September of 1948.

Eliminate the Paper Profits with Lifo

WHAT are profits? Do your books accurately reflect profits? Or do they show as profits what are actually inflationary valuations of goods in your inventory?

Have high tax rates on unrealized paper profits from your inventory caused a serious drain on the cash necessary for operations?

How can you avoid that paper profit and the income taxes on it?

Lifo (last-in, first-out) is one answer.

BACK in the 1930s, iron ore producers lost a legal battle with the government. But from that loss came the seeds for Lifo that today can help you avoid some of the effects of inflation.

No, Lifo isn't a wonder drug or a health-giving drink. It's the abbreviation for the last-in, first-out principle of inventory accounting. The Lifo principle has been in existence since 1938. Are you taking advantage of it to hedge against an inflation that since the start of the Korean war has sent prices soaring again? In 1947 only 22 per cent of 559 firms surveyed by the National Industrial Conference Board used the method of inventory pricing.

From the Ground Up—Lifo had its origin in the "base stock" method of valuation that was declared illegal by the Supreme Court in the 1930s. Ore producers had been the leaders in using base stock. They merely set a base price on base stocks of inventory material that they intended to hold forever. The commissioner of internal revenue challenged the procedure and won his case on the grounds that the base price and the base inventory quantities were arbitrary and had no relation to actual conditions. Lifo is the old base stock method with trimmings to silence the Supreme Court objections for it defies both the base quantity and the base price.

Here's how Lifo works, as explained by H. T. McAnly, a partner in Ernst & Ernst, before the 12th annual institute on accounting held at Ohio State University:

Paper Profit—Assume that at the beginning of the year your company has an inventory valued at $1 million and that there's no change in the aggregate quantity of inventory during the year. But prices during the course of the year go up 10 per cent. So, at the end of the year, the inventory is worth exactly $1.1 million.

Under the traditional method of inventory accounting—the first-in, first-out technique—that $100,000 of increased value enters into the computation of the cost of sales, and so increases net earnings by that amount.

Your company also pays income taxes on the $100,000, even though you never realized the profit. You had the merchandise, not the money. You could have realized the funds only by liquidating the inventory, and a company without an inventory is like a ship wihout an engine.

The Solution — Lifo gives you an out. Under Lifo, the inventory would still be valued at $1 million at the end of the year the same as it was valued at the beginning. The $100,000 of unrealized profit would not be added to reported net income, would not be subject to federal income tax and would not be transferred to earned surplus.

"That's fine," you say, "for iron ore people whose inventory is all one thing, but what about me? I've got an inventory of everything from sheet steel to rubber hose."

The Evolution—That point was a stumbling block in the widescale use of Lifo from 1938 when it was first accepted on a limited basis by the government until 1941. Then, says Mr. McAnly, "in order that all items in a related group of products could be expressed in a common unit, we introduced the idea of the 'dollar value' method of applying Lifo. That treats dollars of investment at a specific price as a common unit. In the application of Lifo, the specific price level is 'cost' at the beginning of the first year of the use of the principle. The use of a basic dollar value as the common denominator makes the application of Lifo practical regardless of the complexity of the inventory."

The determination of the quantity increase of a group of related products can be accomplished by the extension of the individual product quantity in the beginning and ending inventories at the same prices, or by removing the price increase (or decrease) reflected in the ending inventory valued at current cost. To remove the price increase (or decrease) in the ending inventory, you may merely have to determine the percentage changes in acceptable price indexes applicable to the various groups of related products.

U. S. Says O. K.—Some industrial companies adopted the dollar value method as early as 1941. The decision by the U. S. Tax Court in 1946

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in the Hutzler Bros. department store case, approved the dollar value method and the use of indexes. Subsequently the Bureau of Internal Revenue agreed to accept index figures of the Bureau of Labor Statistics for Lifo application in retail trade. In November, 1949, the bureau recognized the use of the dollar value application by any taxpayer.

But there's a joker in Lifo. In amending the Internal Revenue Code to permit Lifo as an elective inventory accounting method, Congress bowed to Treasury Department insistence that the law require anyone embarking on Lifo to stick with the prices prevailing at the time of adoption even though prices later receded. Many companies won't use Lifo now because they fear they may be adopting it at the top of a price trend where they'll be stranded if prices fall. There's no such restriction in the conventional first-in, first-out method of inventory accounting for the lower of cost or market price is permissible.

Eliminate the Guesswork — "The revenue code should be amended," says Mr. McAnly, "to permit the introduction of market values if market prices go below the price computed under the Lifo basis. That would then remove all guesswork as to whether the price levels are low enough at a particular time to adopt the sound Lifo principle."

Even with its price-freeze drawback, industrial users of the technique are finding that Lifo is like a wonder-drug or health-giving drink to guard against the ills of inflation. Many companies that are not using Lifo for tax purposes are at least adopting it in corporate accounting.

LIFO FOR ANY INVENTORY
. . . ships, shoes . . . cabbages, kings

No Muddying the Waters

Cincinnati meeting in November will be the next big assault on water pollution

NEXT BIG assault on water pollution is scheduled for November when the Public Health Service's National Technical Task Committee on Industrial Wastes will hold its second meeting. It will be held in Cincinnati to give delegates an opportunity to inspect the Public Health Service's water pollution research plant there. Presiding officer will be Lyman Cox, chairman of the committee, and waste disposal consultant, E. I. duPont de Nemours & Co. Inc., Wilmington, Del. Assisting him will be Louis F. Warrick, chief, Technical Service Branch, Division of Water Pollution Control, Public Health Service, Washington.

Metalworking's Share — Of special interest to the metals industries will be sessions to be presided over by L. C. Burroughs, Shell Oil Co., New York, and H. F. Hebley, Pittsburgh Consolidation Coal Co., Pittsburgh. Those who will report, and the industries they will represent, are:

Iron and steel, Dr. Richard D. Hoak, Mellon Institute of Industrial Research, Pittsburgh; by-product coke, Dr. W. W. Hodge, Mellon Institute; coal mining, Dr. H. J. Rose, Bituminous Coal Research Inc., Pittsburgh; gas manufacturing, A. Gordon King, American Gas Association, New York; electroplating, Dr. William Blum, National Bureau of Standards, Washington; nonferrous metals, J. C. Dittmer, National Lead Co., New York; electrical equipment, Dr. W. K. Aites, Westinghouse Air Brake Co., Wilmerding, Pa.; automotive, H. C. Fluegge, International Harvester Co., Chicago.

The Public Health Service is looking toward the future in the matter of stream pollution: It conducted surveys showing the types and extent of pollution in all the nation's streams so future pollution planning can be done. The summaries of 16 reports containing the findings are being prepared for publication about the end of the year. Detailed reports will be published next year.

Institute Sponsors Smog Study

Industrial Hygiene Foundation at Mellon Institute in Pittsburgh will study air pollution in a project sponsored by American Iron & Steel Institute.

Steel companies will make their data and equipment available to scientists from the foundation. New methods and devices for collecting samples of air will also be put to work. The program calls for an expenditure of $20,000 within six months to study steel mill processes and atmospheric conditions surrounding many plants. The results of this preliminary research will determine whether a concerted effort by the steel industry in developing air pollution control is needed, and if so, along what lines.

Among the first problems to be solved is the development of standard, practical tests for measuring dust and gas from furnaces. A "smog chamber" will be used, into which controlled amounts of sulphur dioxide, water vapor and various pollutants having a catalytic action can be injected.

Westinghouse Sponsors Meeting

The third biennial Materials Handling Conference, sponsored by Westinghouse Electric Corp., will be held in Buffalo on Oct. 24 and 25.

The first day's sessions will be held at the Hotel Statler; the second day's program will be presented at the Buffalo plant of Westinghouse and will include informal plant tours. Papers will be presented and movies shown. Guest speaker at the banquet Oct. 25 will be Armand T. Gaudreau, a Syracuse, N. Y., consulting engineer in management, production cost, plant layout and materials handling.

100 Years Old This Month

One hundred years ago this month five young Philadelphia Quakers thought they had found the way to success in a new venture—an American chemical company to supply the needs of the rapidly expanding economy and industry of the Midwest. They had a patent for process of making alkalies from salt, $100,000 in capital raised among themselves and 12 friends, a plant site over salt deposits near Pittsburgh, then the gateway to the West, and almost boundless courage and hope.

Within five years the process had proved a failure and virtually their entire investment appeared lost. But somehow they summoned money and hope and gave their venture another try. They weren't sorry.

Today their company is one of America's leading basic chemical manufacturers, producing at its century mark at the rate of $38 million-worth of products a year for nearly every industry in the country. The bright Quaker dream came true. The company's name: Pennsylvania Salt Mfg. Co. Its address: Philadelphia.

Mill Name Changes Again

Indianapolis mill resumes operations under the name of Sheet Steel Mills Inc.

RESUMING OPERATIONS under the name of Sheet Steel Mills Inc. is the Indianapolis rolling mill that originally was owned by Chapman-Price Steel Co. Officers of the new company are: Alvin A. Schultz, president and secretary; Mary Schultz, vice president and treasurer and C. W. Richart, assistant treasurer.

When in full operation the mill will produce about 5300 tons of sheet a month, says Mr. Schultz. Two roughing mills and one finishing mill are in use at present. The mill's galvanizing facilities are being utilized to full capacity.

Product range embraces hot-rolled pickled and oiled sheets and galvanized sheets in gages 12 to 30. Maximum width is 36 inches; maximum length is 120 inches. Sheet bar commitments were obtained to assure operations through this year. This new company leased the mill property for a year with option to buy at the end of that time for $500,000. Right now the facility is owned by a Cincinnati syndicate.

Built in 1921 by Chapman-Price, the plant was taken over by Continental Steel in 1927. Then it was bought by Kaiser-Frazer Parts Corp. in 1947 and acquired by Whitney Steel in 1948. Last October its galvanizing facilities were taken over by Sheet Steel Galvanizing Corp.

Acme Building One Big Office

Ground has been broken and the preliminary construction begun on Acme Steel Co.'s new $125,000 building at Riverdale, Ill.—just 150 feet outside the gates of Acme's main plant. Carl J. Sharp, president, says the building will serve a welcoming function for the plant: All visitor-centered activity—reception, purchases, employment—will be combined under one roof. The move will eliminate the need for salesmen, customers, new employees and the public to travel across Acme's 219-acre grounds to the proper building.

The building, expected to be complete before January, 1951, will contain over 12,000 square feet of floor space.

Westinghouse To Get TV Plant

Westinghouse Electric Corp. has announced plans to build a new television plant at Metuchen, N. J. It will nearly triple the firm's TV manufacturing capacity. The plant will be on a 50-acre site and will have over 400,000 square feet of floor space under one roof. Austin Co., Cleveland, is the contractor.

"Although the plant is being built for television manufacturing and is part of long-range plans made months ago," J. M. McKibbin, Westinghouse vice president in charge of consumer products, says, "we certainly intend to make it adaptable to possible requirements of the military in case of war."

The Metuchen plant will serve as headquarters for the Westinghouse Television-Radio Division. Westinghouse's Sunbury plant in Pennsylvania will continue to produce radios and television sets. Its peak employment is 2000. Eventually the Metuchen plant will employ 3000 at peak operations.

One of the many reasons Westinghouse selected the area to build its new plant was its proximity to the TV color testing area.

Modine Starts Another Unit

Modine Mfg. Co., producer of radiators for the West Coast output of Ford, Lincoln and Mercury automobiles, began construction of the first unit in its planned plant expansion. The plant is part of an $8 million Racine, Wis., auto parts organization. The Modine plant is in the Whittier industrial tract, developed by the city of Whittier for light industry several years ago. The expansion will add 31,000 square feet to the present 15,000-square-foot area.

Oliver Buys Control of Berry

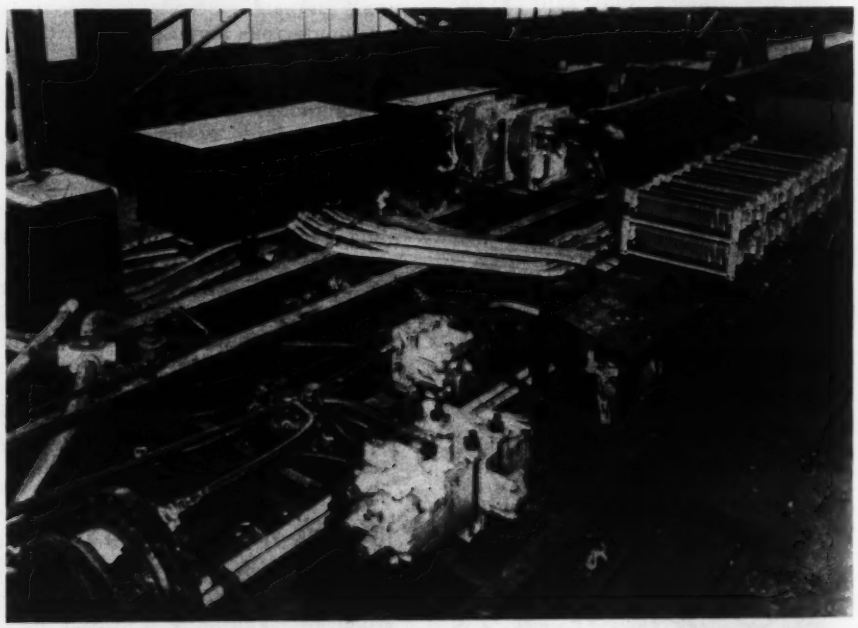
Interests closely associated with Oliver Iron & Steel Corp., Pittsburgh, bought management control stock of Berry Motors Inc., Corinth, Miss. Berry manufactures hydraulic transmissions and liquid transfer pumps. The Pittsburgh group had previously owned a minority position in Berry.

Pemco Expanding Facilities

Pemco Corp., Baltimore, manufacturer of porcelain enamel finishes, colors, ceramic glazes, stains, glass colors and ceramic chemicals, is expanding its plant facilities to meet the increased need for its products. R. H. Turk, president, made the announcement. The expansion involves the expenditure of about $250,000 and the addition of over 30,000 square feet of floor space. It comes at a time when Pemco's production is at a higher level than it has ever been in the company's 40-year history. Consolidated Engineering Co. Inc., Baltimore, has the contract. The entire expansion is expected to be completed by Nov. 1.

National Roll Adds 2 Furnaces

National Roll & Foundry Co., Avenmore, Pa., added two electric furnaces to its plant for the manu-



BOTTOM'S UP: The bottom framework of one of the 100 new multiple unit passenger cars being built by St. Louis Car Co. for commuter service on the New York Central Railroad may be seen in this view. The framework is upside down so all air brake, electrical and other equipment can be installed with ease. All air brake piping is of wrought iron. As soon as the underside is completed, the framework is righted and the body built atop it

facture of Ni-Hard, Ni-Resist and ductile iron castings. W. H. Seaman, chairman of National's board, says the new equipment will be in operation shortly. Further expansion is being carried on; topping the list are complete modernization of the roll foundry building and handling equipment and installation of new type air furnaces.

Rust Gets J & L Contract

Rust Engineering Co., Pittsburgh, will build a new storage building—greater in area than a football field—for Jones & Laughlin Steel Corp. The building will be used for storage of rough stock from J & L's Hazelwood cold finishing department. The one-story building, of steel frame construction with corrugated iron siding and roofing, will be 90 x 720 feet. Rust's contract includes installation of storage racks, crane runway and power and light facilities.

Armco To Modernize Plant

Armco Steel Corp. will spend at least $15 million to modernize its Ashland, Ky., plant.

A modern slabbing mill will be installed, along with other rolling and processing equipment necessary to produce steel coil 72 inches wide. Plans for the modernization project are still incomplete, says Chairman Charles R. Hook. Until the engineering work is further advanced, the cost of the program cannot be accurately estimated. For that reason no contracts have so far been let, except for electrical equipment. Engineers believe that construction will be started about the first of 1951 and that the job will take 12 to 15 months to complete.

The Ashland mill, started in 1924, was the world's first successful continuous sheet rolling mill, says Mr. Hook. Introduction of the hot strip principle and other improvements make the pioneer unit out of date.

Cobalt, Ferroalloy Output To Rise

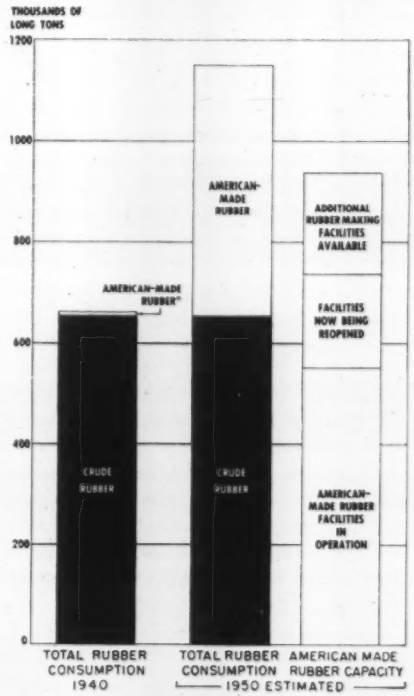
American steel producers may benefit from two developments in the Pacific Northwest. Howe Sound Co. a year from now will begin producing cobalt from its Blackbird mine in Idaho in sufficient quantities to relieve this country's dependence on foreign sources for the element.

The mine's ore reserves are sufficient to support a 600-ton-a-day operation for a number of years. Each ton of ore is estimated to contain about 14 pounds of cobalt and 32 pounds of copper. When the new mine is completed, about the middle of next year, it is expected to produce about 2 million pounds of metallic cobalt annually. Consumption of cobalt this year is running at a rate of about 6.5 million pounds, of which the U. S. will produce less than 600,000 pounds.

In Spokane, Wash., Pacific Northwest Alloys Co. is preparing to double its output of ferrosilicons and ferrochrome. The expansion, planned more than a year ago, was delayed by a shortage of power.

Consumption, Capacity of Rubber in U.S.

1940 versus 1950



Source: B. F. Goodrich Business Research Department

* U. S. had facilities for producing only 4500 long tons of man-made rubber at the end of 1940

The Situation in Rubber

Today the nation is consuming rubber at more than a million tons a year. But it has the facilities for producing 940,000 tons of rubber made right here in the U. S. The output of man-made rubber will be at the rate of 740,000 tons early in 1951. Back in 1940 the U. S. consumed 650,000 tons of rubber; 97 per cent of it came from the Far East. At that time there was in existence in this country only 4500 tons of man-made rubber of all types. During the latter months of World War II America turned out man-made rubber at a rate of a million tons a year.

The rubber situation now compared with 1940 is shown above.

New Heads for Newport

Steel company under new guidance as midwestern investors buy into it

NEWPORT Steel Corp. is under new guidance.

Heading the company now is a group of midwestern investors. New chairman and president is Frank S. Gibson Jr., vice president and secretary-treasurer of the Gibson Refrigerator Co., Greenville, Mich. New vice president and chairman of the finance committee is William J. Mericka of the Cleveland investment firm of William J. Mericka & Co. Inc., which assisted the principals in the transfer of stock ownership.

New secretary is Glenn G. Paxton of a Chicago law firm, and assistant secretary and treasurer is H. E. Hamilton who had been secretary and controller of Newport Steel.

Buy Part of Stock—The stock purchased by the group of midwestern investors is reported to be that which was held by the largest stockholder and some of his associates. The midwestern investors purchased only a portion of the Newport Steel stock but they in effect acquired controlling interest. Mr. Gibson said "We are going to operate the company for the benefit of all of the shareholders."

Prior to this stock purchase, Newport Steel's chairman and president was C. Russell Feldmann, New York.

Operating personnel of Newport Steel's properties will remain unchanged, with C. M. Riefkin continuing as general manager.

The stock purchase by the midwest group follows by only a few weeks the discussion of Newport Steel and Follansbee Steel Corp. of possibilities of a merger. Recently those two companies terminated discussions.

Everything Sold—Sale of Newport Steel includes the company's steel producing and rolling mill at Newport, Ky., its blast furnace at Martins Ferry, O., its Universal Cooler Division at Marion, O., and its Caswell-Runyan Division with plants at Huntington and Goshen, Ind.

Newport Steel has three electric steelmaking furnaces with a total capacity of 30,000 tons a month and seven open hearths with a monthly capacity of 35,000 tons a month.

The company's blast furnace has been idle for a year.

Newport Steel Corp.'s works at Newport were purchased in August, 1946, from the Andrews Steel Co. The purchasing company was known as International Detrola Corp. In April, 1947, it bought the blast furnace at Martins Ferry from Wheeling Steel Corp.

Windows of Washington

By E. C. KREUTZBERG — *Washington Editor, STEEL*

House Appropriations Committee approval of $850,000 for domestic manganese output is the first move to make the U. S. self-sustaining in the metal

A PREMIUM-PAYMENT PLAN will be the mainstay of domestic manganese production if a bill approved by the House Appropriations Committee gets favorable action. The committee's approval is the first step taken to make the U.S. self-sustaining in manganese if there's a serious interruption to manganese imports.

The bill provides $600,000 for construction of a pilot plant to get a commercial size plant started in the business of concentrating manganese ore and $250,000 to push the development of a process for reclaiming manganese from open-hearth slag (when Lake Superior ore is used).

Divining Rod — Where will the manganese come from? The big gun as far as domestic manganese ore is concerned is Artillery Peak, Ariz., where a large deposit of low-grade ore was discovered before the turn of the century. Some western mining men say the largest low-grade ore deposit in the western hemisphere is located there. Dr. James Boyd, director of the Bureau of Mines, says upwards of 300,000 tons of high-grade manganese concentrates can be obtained yearly from deposits at Three Kids, Nev., the Cuyuna range in Minnesota, Aroostook county, Maine, and the Artillery Peak deposit. He thinks another 100,000 tons could be obtained from many small deposits in Arkansas, California, Montana and the Appalachian region. Production would depend to a great extent on enactment of the Mills bill under which the government would pay premium prices for domestic manganese for stockpiling.

Beneficiation—The Durham stockpiling subcommittee of the House Armed Services Committee is expected to recommend enactment of the Mills bill. Under it the government would buy domestic manganese ore at about double the present import price of 80 cents a long ton unit c.i.f. tidewater for 48 per cent ore. The price schedule would be a sliding scale affair based on the Bureau of Labor Statistics wholesale price index. The government would pay $1.66 a unit for domestic ore, for example, when the index is 160. The current price would be higher.

The Durham subcommittee favors continuation and intensification of the campaign to salvage manganese from open-hearth slag (STEEL, Aug. 21, p. 69), but informed witnesses told the subcommittee that it would require from three to five years to complete development of the process to get it into tonnage production.

Titanium Needs Testing, Time

The future of titanium in naval applications is promising, but the Navy's Bureau of Ships thinks adoption of the metal will not be an overnight development. One big reason is the many tests that will be needed to find out how well titanium can meet specific service conditions. And only time will tell if economic considerations warrant its use in the different applications.

BuShips is studying specific application of titanium: Seat and disk trim in salt water valves, steam condenser tubing, tubing in heat exchangers in which hot exhaust gases are on one side and sea water coolant on the other, shafts for salt water pumps, outboard propeller shafts for small craft, wet exhaust mufflers for diesel engines.

One important application being looked into is that of titanium blades for steam turbines. The study includes a determination of the high-temperature properties of titanium, a determination of the adaptability of various methods of forming to titanium and a determination of turbine blade erosion in wet steam.

BuShips will launch a test program soon to find out how titanium stacks up as a replacement for copper-base alloy wires that fail from stack gases and the like. A contemplated test program on small, highly stressed titanium marine propellers is held up right now pending development of the best method of fabricating such propellers of titanium.

Got Any Transport Ideas?

Testing and approval of new-design transportation equipment has been assigned to the Army Transportation Corps' newly created Transportation Research and Development Station, Fort Eustis, Va. The new agency (it replaces the former Army Transportation Corps Board) is charged with making recommendations for procurement of all types of equipment. Manufacturers are urged to send new ideas and designs to the commanding officer at the station, Lt. Col. R. D. Meyer.

3 Named to Ordnance Committee

Three industry men have been added to the Committee on Ordnance.

NEA

CIVILIAN BRASS: Sen. Millard E. Tydings (Dem., Md.), chairman of the Senate Armed Services Committee, and Rep. Carl Vinson (Dem., Ga.), chairman of the House Armed Services Committee were happy when the President approved of a $500,000 expansion in the Army's tank-building program

Research and Development Board: John S. Newton, vice president in charge of engineering, Baldwin Locomotive Works, Philadelphia; James Fairman, vice president, Consolidated Edison Co. of New York Inc., New York city; and Dwight T. Colley, vice president, Atlantic Refining Co., Philadelphia.

Chairman of the committee is Dr. J. A. Hutcheson, director of research, Westinghouse Electric Corp., Pittsburgh. Military members are: Army, Maj. Gen. Elbert L. Ford, Chief of Ordnance and Brig. Gen. Leslie E. Simon, Office of Chief of Ordnance; Navy, Rear Adm. J. A. Snackenberg, Deputy Chief, Bureau of Ordnance, and Captain Edward N. Parker, Office of Chief of Naval Operations; Air Force, Col. John F. Babcock, headquarters, United States Air Force, and Col. D. R. Ostrander, Air Materiel Command.

Cooking Pot, Mug & Bucket

Aluminum is to supplant steel in Army helmets—an application that consumed a large tonnage of sheet steel during World War II.

After successful preliminary tests, the Quartermaster Corps ordered 2000 aluminum helmets for actual field testing by troops. If the field test works out as expected aluminum helmets will become the Army standard. The aluminum helmet, like the steel helmet, has a plastic liner. Unlike the steel helmet and liner combination, the aluminum helmet's liner affords the principal resistance to shell fragments and falling objects; in fact, the new liner alone affords as much protection as the old steel helmet and liner together. The aluminum shell, though it offers additional protection, is intended principally to serve the collateral uses of cooking utensil, shaving mug and water bucket. The new aluminum shell and plastic liner combined weigh approximately three pounds, 15 per cent lighter than the present steel helmet and liner.

Plan To Decentralize Government

You'll have to learn your way about Washington all over again if Congress approves President Truman's request for $140 million to decentralize government. The plan is for construction of new government buildings at four unspecified sites within commuting distances of Washington. The buildings would have facilities for the 35,000 to 40,000 government employees who would work in the buildings. New highways would be built to put the sites within easy reach of Washington. The sites would probably be within a 30-mile radius of the capital.

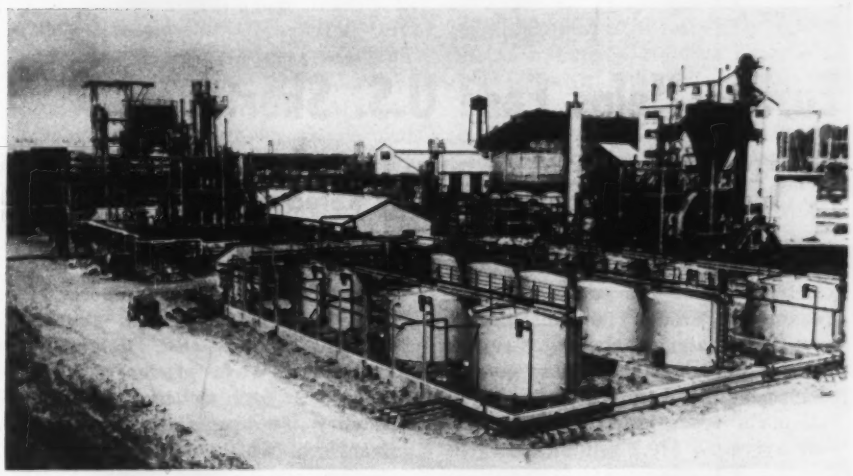
The measure, once proposed by the National Security Resources Board to make Washington a less vulnerable target, would put "top priority" defense groups like NSRB, the Atomic Energy Commission, the Munitions Board, the State Department, the new National Production Authority in the outlying areas. Skirting around the presidential request is talk about an alternate White House and a meeting chamber for the two houses of Congress—just in case of an emergency.

How will Congress react to all that? It's difficult to say now, but it seems from the talk of some congressmen that if they vote for the measure, they'll want the shift to put key agencies more than an hour's drive out of Washington.

Handbook Out on Liquid Metals

"Liquid-Metals Handbook" is the title of a 194-page book just published by the Office of Naval Research in co-operation with the Atomic Energy Commission and the Navy's Bureau of Ships. Its subject is the industrial use of liquid metals for heat-transfer purposes and it contains chemical and physical properties, corrosion data and handling techniques. Copies may be obtained at $1.25 from the Superintendent of Documents, Washington 25.

Gas Synthesis Purports To Be No Drop in the Bucket



FISCHER-TROPSCH PROCESS WITH AMERICAN MODIFICATIONS
. . . to translate laboratory data into cost and engineering information

THE SECOND Bureau of Mines gas-synthesis demonstration plant at Louisiana, Mo., will begin operations sometime early next year. Designed and built by Koppers Co. Inc., Pittsburgh, it will be an 80 to 100-barrel-a-day unit that will convert coal to oil by a modified Fischer-Tropsch process. The plant was built under the bureau's synthetic liquid fuels research and development program to translate laboratory data into cost and engineering information directly useful to industry in planning, building and operating commercial-scale installations (5000 or more barrels per day). Such installations will be no mere drop in metalworking's bucket (STEEL, April 10, p. 63).

Roll Out the Barrels—The plant will gasify coal with oxygen and superheated steam and then convert the resulting synthesis gas—a mixture of carbon monoxide and hydrogen—to liquid fuels by passing it over a catalyst. With American modifications, the Fischer-Tropsch process is well adapted to the production of a good grade of gasoline and an excellent diesel fuel. Available by-products will be alcohols, wax, aliphatic acids and hydrocarbon gases. Any rank of coal from anthracite to lignite may be used. During the war the use of the gas-synthesis process was used by the Nazis to such an extent that by January, 1944, Fischer-Tropsch plants were producing 10,000 barrels of product daily.

The first demonstration unit completed by the bureau at Louisiana, was the 200 to 300-barrel-a-day hydrogenation demonstration plant which has been in operation since early last year. It employs the German-origin Bergius process for converting coal to liquid products ranging from high-octane aviation gasoline to heavy fuel oils.

Foreign Trade Shows May Aid U.S.

Sept. 16-Oct. 1	Electric Fair, Munich, Germany
Sept. 16-Oct. 1	Electrical Appliance Exhibition, Bologna, Italy
Sept. 16-Oct. 2	Trade Fair, Marseille, France
Sept. 17-22	Trade Fair, Frankfort, Germany
Sept. 23-Oct. 8	Sample Fair, Bolzano, Italy
Sept. 23-Oct. 8	Sample Fair, Zagreb, Yugoslavia
Sept. 30-Oct. 8	Graz Autumn Fair, Austria
Sept. 30-Oct. 15	Nautical Exhibition, Paris, France
Sept. 30-Oct. 15	Finnish Industries Fair, Helsinki
Oct. 5-15	Automobile Show, Paris
Oct. 5-15	Printing and Allied Trades Equipment Exhibition, Paris
Oct. 5-15	Packaging Exhibition, Paris
Oct. 11-21	Hosiery, Knitting Machinery Exhibition, Leicester, Eng.
Oct. 13-16	Radio-Electrical Equipment Exhibition, Paris
Oct. 18-28	Motor Exhibition, London
Dec. 2-11	Cycle, Motor Cycle Exposition, Milan, Italy
Jan. 13-24	Auto and Cycle Exposition, Brussels
Feb. 27-Mar 4	Farm Machinery Exhibition, Paris
Feb. 28-Mar. 4	German Industries Fair, Hanover
Mar. 11-18	Vienna Spring Fair, Vienna
Mar. 31-Apr. 9	Trade Fair, Lyon, France
Apr. 7-17	Swiss Industries Fair, Basel
Apr. 21-May 8	Industries Fair, Brussels
May 28-June 8	Canadian Trade Fair, Toronto

Europe Helps Ease U.S. Shortages

Products from ECA countries are helping to beat American materials shortages caused by Korea and the high civilian level of output

AMERICAN buyers are relying increasingly on ECA countries to help beat U. S. materials shortages caused by the Korean war and general break-neck economic activity.

Imports from ECA countries last year averaged $70.2 million a month. They're rising to nearly $80 million a month this year. U. S. exports to ECA countries in 1949 averaged $339.3 million monthly. The average thus far this year has dropped to about $260 million a month.

A Trip Abroad—If you're hunting for a stop-gap solution to your material supply problems, don't overlook European trade fairs. Some U. S. purchasers find that travel time and money can be saved by placing orders at the exhibitions. The major ones are listed above.

ECA nations are also bringing their fairs to you. Belgium has permanent trade exhibits at Dallas, Kansas City, Mo., Los Angeles, New Orleans, Seattle and St. Louis. A Belgian show in Chicago will last until October, 1950. One in San Francisco will close June 30, 1951. Portugal has a permanent exhibit of raw materials in New York. A permanent Netherlands products exhibition is also in New York.

Push the Advantage—ECA countries are following through in other ways to get more U. S. business. A rash of American agencies has sprung up to handle imports. One is Belgemeric Corp., San Francisco, which will represent Belgian and Luxemburg steel producers in both the U. S. and Canada. Another is Fidelity Trading Co., also of San Francisco, which will represent two German steel manufacturers. Fidelity plans to set up warehousing facilities in San Francisco to stock the foreign materials. Fidelity will also handle Japanese steel products.

If an ECA program to spur investment abroad bears fruit, the present temporary shift in the export-import ratio might prove permanent. One of the principal provisions of the new Marshall Plan law provides for dollar convertibility guarantees to American business of foreign currency proceeds from investments in ECA countries. If more American business men invest in European industry, they're more likely to use the products produced by their foreign associates.

To Darkest Africa—A large part of American investment capital is expected to flow to European dependencies. ECA has already shifted some of its activities to undeveloped areas. In the fiscal year ending June 30, 1950, $7 million had been approved for the financing of 18 economic development projects in the overseas territories of Marshall Plan countries.

France Develops African Ore

France hopes to develop its Guinea dependency on the west coast of Africa into a leading world producer of iron ore. By 1952 ore will be mined at the rate of 500,000 tons a year; 1.2 million tons will be mined in 1953 and 3 million tons in 1954.

Great Britain will buy at least 500,000 tons a year. Other buyers will be steel producers in West Germany, Belgium and Luxemburg. The ore is on the surface of the ground. A first bed is 6 feet thick; a second bed, below, is 30 feet thick. The ore contains 51 per cent iron.

American steel buyers are dickering to get 150,000 tons of French steel products. If the deal goes through, French steel exports in the remaining months of the year will be four times the average monthly shipments in early 1950.

France has agreed to a new monthly minimum pay in the Paris region of 16,400 francs ($47). The lowest paid workers in the area will get an $8 a month raise because of the agreement. Lower scales exist for the provinces where the cost of living is cheaper than in Paris.

Renault, the auto producer, has reportedly signed a contract with Nash-Kelvinator Corp. to send 4-horsepower automobile spare parts to South Africa to be assembled in the Nash-Kelvinator plant.

Italian Steel Mill Modernized

Marshall Plan dollars will finance a little less than one-third of the cost of a modernization project at the Rogoredo, Italy, steel plant of Giuseppe e Fratelle Redaelli S.p.A. Total cost of the project is estimated at the equivalent of $3,125,000. ECA will provide $983,000 to pay for wire rod and light section mill equipment to be purchased in the U. S.

The modernization project will replace obsolete equipment. The plant has an ingot steel capacity of about 100,000 tons a year. The facility is just south of Milan and consists of five furnaces for ingot steel, as well as various rolling mills. Equipment to be furnished will eliminate hand looping.

Redaelli, founded in 1870, is an independent steel producer and fabricator of billets, shapes, sheet bars, strip, coils, sheet, wire rods, nails, fasteners, wire rope and miscellaneous small hardware items. The company operates four plants. The most important is at Rogoredo.

Tito Gets Another $15 Million

The U. S. will lend another $15 million to Yugoslavia through the

Export-Import Bank. A total of $55 million has now been loaned to Marshal Tito in the last 12 months.

Yugoslavia is using the loan to rehabilitate mines, improve agriculture and buy equipment to expand industrial production.

Lewis Supplies Austrian Mill

Lewis Foundry & Machine Division of Blaw-Knox Co. has received an order from Austria under ECA provisions to supply steel strip rolling mill equipment.

The order was placed by Alpine Montan Co., largest steel producer in Austria, and is for installation in the Kreiglach plant at Leobon, Styria, Austria. Equipment includes three rolling mills and auxiliary equipment for processing cold-rolled steel strip up to 18 inches wide.

U.S. Equipment for Belgian Plant

Orders involving U. S. dollars and Belgian francs have been placed by S. A. D'Ougree-Marihaye with Westinghouse Electric International Co. and its Belgian licensee, Ateliers de Constructions Electriques de Charleroi.

Westinghouse motor and control equipment is now being installed or is on order for the Belgian steel company's plant at Ougree, near Liege, where a 132-inch plate mill is under construction. Funds have been authorized by ECA to cover the present plate mill, as well as a strip mill to be built later.

New Buyer for Chile Appointed

Compania de Acero del Pacifico, operator of Chile's newest steel mill at Huachipato, has named Pacific International Corp. as its purchasing agent in the U. S. and Canada. The mill is already in production.

Previous U. S. purchasing has been handled by Corporation de Fomento de la Produccion de Chile, a government organization. Appointment of the new agent does not affect any outstanding orders from Fomento, nor does it preclude the possibility of Fomento's placing of new orders.

Pacific International is at 42 Broadway, New York.

Iranian Plant with American $$

Will the iron and steel plant on the Iranian government's seven-year development agenda be of American design and financed by American dollars? That is one of many questions to be looked into by a delegation that left for Iran last month. In the delegation were Oliver C. Lockhart, William Gates and Frank Kimball, sent by the Export-Import Bank of Washington at the request of the Iranian government.

Plenty of Oil, Says API

American oil companies have spent $8 billion in the past five years for new facilities, exploration and development and are better prepared than ever before to meet any emergency.

Frank M. Porter, president of the American Petroleum Institute, says that the nation's capacity to produce and refine petroleum, as well as its proved reserves of underground oil, have increased by about 25 per cent since the climax of World War II created peak demands for petroleum products.

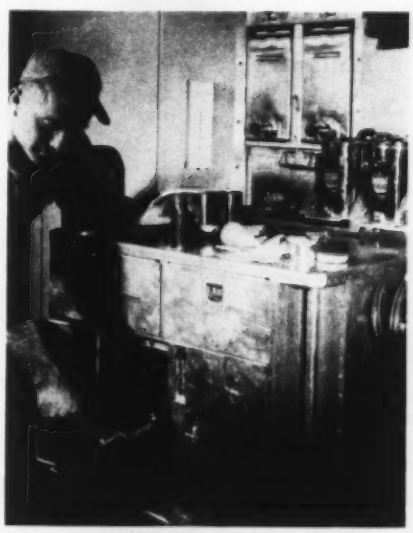
Oil Well Drillings Surge

More oil wells will be drilled in the second half than in any half-year period in history, an *Oil and Gas Journal* survey shows. Company replies show 4391 wildcat wells and 18,435 development wells for a total of 22,826 with 84,493,000 feet of hole are scheduled. Total completions in the first six months already set an alltime record for the period so the entire year's total will be well out in front of all other years. Revised forecast for the year now stands at 43,084 wells compared with 39,038 in 1949 and 39,778 in 1948. Even though steel is already tight possibility of use restrictions in 1951 may further step up some drilling schedules.

Oven Makers Work on Care and Feeding of Air Crews

WHEN air-to-air refueling techniques make non-stop flights around the world routine affairs, there won't be any cuisine problems for air crews. Companies like Mansfield Aircraft Products Co., Mansfield, O., Weber Show Case Co., Huntington Park, Calif., and Russell R. Cannon Co., Cincinnati, are working with the Air Materiel Command's Aero Medical Laboratory at Wright-Patterson Air Force Base, Dayton, O., and the Quartermaster Food & Container Institute on keeping food warm at 30,000-plus feet.

Housewives Will Sigh—The Aero Medical Laboratory thinks it has found the answer to making food palatable after long hours or even days in the air. It has a whole line of food warming ovens so efficient that many a housewife will sigh to have the high-altitude utensils grounded in her own kitchen.



CHOW-TIME AT 30,000 FEET
. . . what's for dinner?

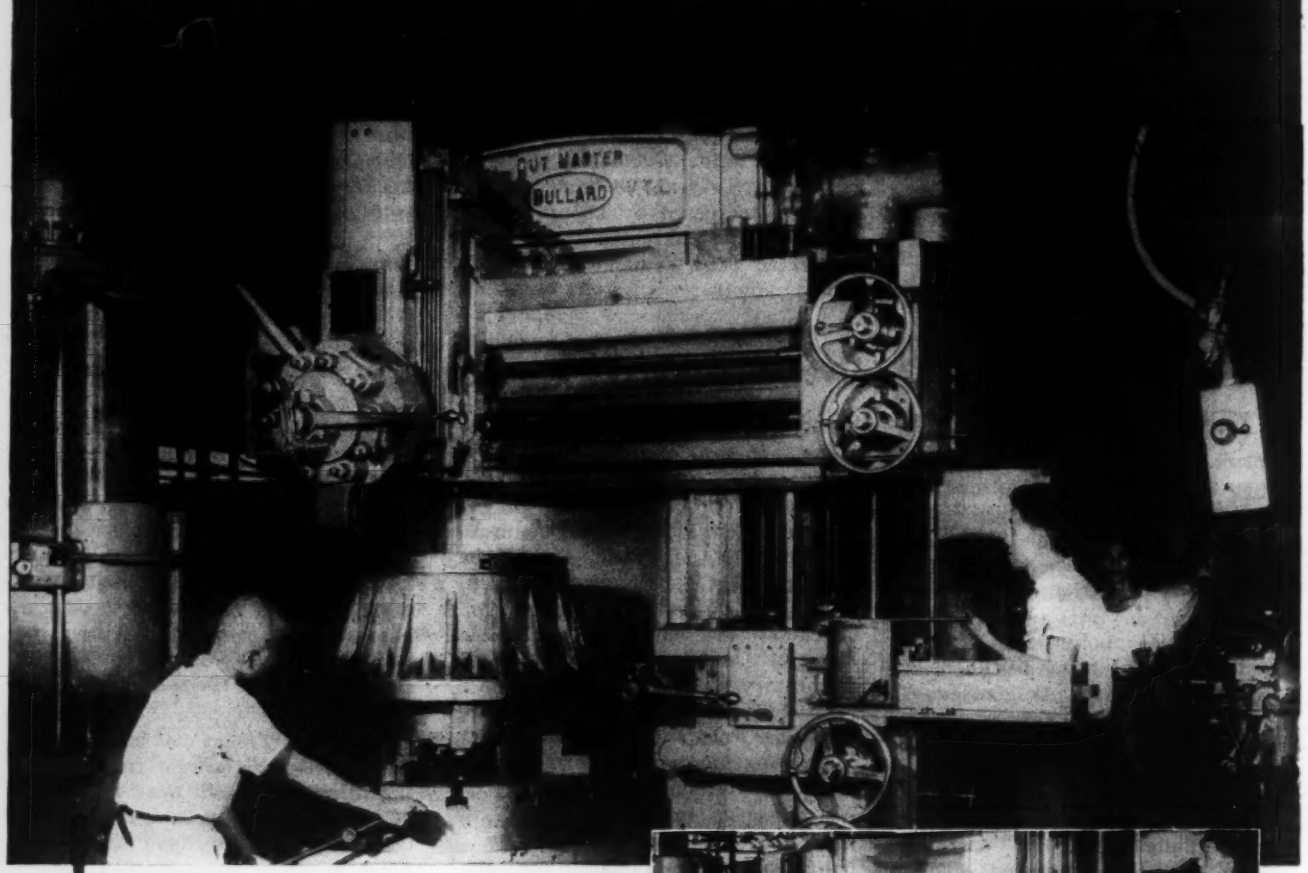
Take the B-3 oven. It can heat eight cans of IF-2 ration in as little as 11 minutes. Its two shelves are heated with 400 watt units, augmented by an additional 120 watts in each side of the oven. Heat is regulated by thermostats that assure heat under 212° F, eliminating food can explosions. B-29s and B-50s will be equipped with two of the light-weight ovens. They tip the scales at a mere 8½ pounds.

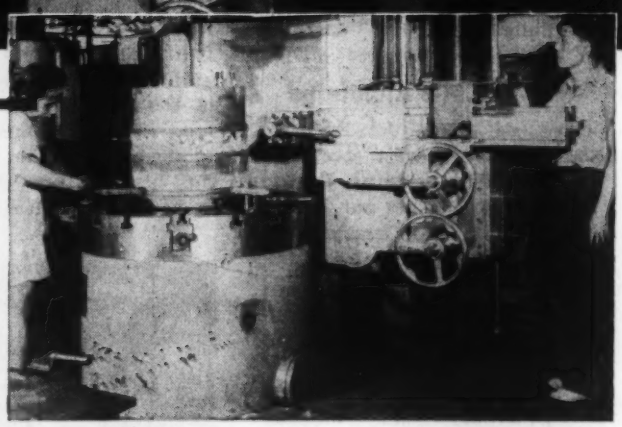
Feed the Troops—A larger oven, the B-1, is designed for troop carrying aircraft. It can heat 48 cans of IF-2 ration in about 35 minutes. Each troop carrier will have two large heaters.

The care and feeding of the 16-man B-36 crew is a somewhat specialized problem. Because it is designed exclusively for long flights, the Air Force's biggest bomber will have facilities for heating and serving frozen meals on routine flights as well as the more practical IF-2 canned rations that are better suited to combat conditions. For those frozen meals a B-4 oven was perfected. It can heat six frozen meals in 35 minutes, using 375 watts to heat each meal. Each B-36 airplane will boast two 20-pound B-4 ovens and four small ice boxes to hold dry ice and the frosted meals in temperatures ranging between 0 and minus 10° F.

Now: Automatic Can Openers—Fighter pilots are not being ignored in the care and feeding program. Still in the design and development mill is a small B-5 oven for fighter aircraft. Cylindrical in shape, it will hold two or three cans of IF-2 ration and feature a trapdoor arrangement with a motor driven can opener in the bottom. The arrangement will allow a busy pilot to insert, heat, remove and open his ration—one handed.

TANDJONG, PRIOK





FAR, FAR AWAY!

in the shops of the Royal Packet Navigation Company shipyard, Tandjong, Priok, a Bullard 42-inch Cut Master Vertical Turret Lathe has found its place.

Reliability, Simplicity of operation and Performance account for many foreign installations.

We proudly mention a 64-inch Cut Master equally far away in the Oil Fields of Sauda, Arabia.

Selection of these machines for such far away places bespeaks Confidence in BULLARD Equipment and Service.

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By A. H. ALLEN *Detroit Editor, STEEL*

Mirrors of Motordom

Auto and truck assemblies in 1950 may soar above 8 million now that labor has been satisfied. Output will have to be high because break-even points are up a peg

DETROIT

WITH labor ructions out of the way by virtue of sudden and unprecedented wage increases which fanned over the entire automotive industry like a prairie fire, automobile production will head into the fourth quarter of the year toward a new alltime high record.

By Sept. 30, estimates indicate assemblies of cars and trucks will be well past the 6¼ million mark. Despite interruptions caused by model changeovers during the next three months plus expected continuing tightness in materials, 1950 should close with output soaring well above 8 million.

The Picture Changes—Limitations caused by government stockpiling of nonferrous metals and rubber will have to be reckoned with, although at the moment they do not appear as serious deterrents to maintaining auto output close to current levels. In fact, there may be more concern over whether the market will sustain today's volume than whether sufficient materials will be forthcoming to hold the pace. Panic buying has subsided to a marked degree of late.

How much this may have robbed future sales remains to be seen. Meanwhile, used car prices have been softening steadily in recent weeks, an indicator which must be evaluated in terms of demand for new models.

Should it become established that sales departments really will have to go to work, the conclusion is inescapable that merchandising campaigns of the most expensive and intensive type will be launched. For one thing, the last round of wage increases, touched off by General Motors and followed quickly by Chrysler, the independents and finally Ford, has moved break-even points up another notch, narrowing the degree to which production can fall off before the black ink turns to red. Just where this demarcation now rests cannot be determined for sure. It varies from one manufacturer to another, probably is higher for the independent builders than for the big three. However, a 30 per cent drop from the present assembly tempo would give most companies real concern.

Smooth Sailing — Ford's 8-cent wage boost to 81,500 hourly rated employees was accompanied by additional hikes of 5 cents an hour to 28,500 skilled workmen, foundry employees and others engaged in 7-day operations, as well as to 30,000 salaried personnel, all increases being retroactive to Sept. 1. The agreement was reached quietly and without delay in the most cordial of union-management atmospheres. It was remarkable in that it superseded a contract which still had 19 months to run.

The latest revision incorporates the "annual improvement factor" of 4 cents an hour, along with a tie-in of wage scales to the government cost-of-living index, both identical with the General Motors wages setup.

Thus GM and Ford are now firmly geared together on wages and neither can gain the advantage over the other.

The latest move marked recognition on the part of Ford of the soundness of the GM plan, but this is not surprising in view of the large number of former GM executives now directing the top policy determinations at Ford.

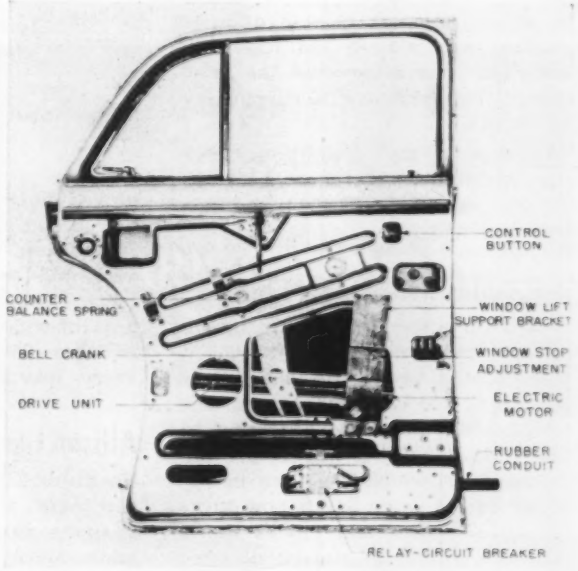
'Auto Facts' Off the Press

Each year the Automobile Manufacturers Association compiles the industry's vital statistics into a small handbook known as Automobile Facts & Figures. Lastest edition, just off the presses, is the thirtieth and covers factory sales just exactly 50 years. In the past half-century, U. S. plants have turned out 108,410,635 motor vehicles, worth at wholesale better than $87 billion. Last year saw a flock of new automotive records established, including passenger car output, passenger registrations, motor truck registrations, motor bus registrations, gasoline consumption, and special taxes collected on motor vehicles.

Unprecedented sales of new automobiles were financed mostly by cash payments, with 56 per cent so bought, 43 per cent on time payment plans and 1 per cent by other methods. In the U. S., 71 per cent of all families own automobiles, and one-third of the car-owning families buy new models.

Other selected automotive facts, amplified in the booklet by tabulations and charts, include:

As of July 1, 1949, 42 per cent of the automobiles in use were ten



IMPERIAL DESIGN: Cutaway view shows the all-electric window lift that is standard on Chrysler Imperial models. Each door has its own unit. Mounted on a fixed steel frame, the electric motor operates a screw shaft. As the screw turns, the nut with a slider attachment travels along the screw shaft, guided by the V-ways of the frame. Drive movement is transmitted to the slotted lower leg of the bell crank through a pulley-like bearing attached to the slider nut assembly. The boomerang-shaped bell crank is held at its center in a fixed pivot, the upper leg engaging a slotted guide at the base of the window channel. As the lower leg is pushed forward and up, the upper leg is pulled across and down, bringing the window along with it

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years of age or older, compared with 17 per cent in 1941. Average age of cars in use was 8.5 years, against 5.5 years in 1941.

Exports in 1949 figured to 3 per cent of the cars and 12 per cent of the trucks produced. Imports totaled 8366 vehicles, against 29,112 the year previous.

Four-door sedans continued the most popular body type, accounting for 49 per cent of all factory sales. However, two-door sedans and coupes gained 2 percentage points over 1948, while the four-door types fell by 1 percentage point.

Sales of replacement parts and accessories were valued at slightly under $2 billion, off half a billion from 1948 but still four times the 1939 volume, giving no account to changes in the value of the dollar.

Gasoline consumption in 1949 was 33 per cent higher than in 1941, motor vehicle travel in mileage 27 per cent higher.

Based on 1948 figures of the Census of Business, automotive retail sales represented 20 per cent of all retail sales, totaling $26 billion. These automotive establishments include gasoline filling stations and comprise one out of every six retail businesses.

Special motor vehicle taxes in 1949 reached $3845 million, up $370 million from 1948. Biggest bites are taken by federal excise and state gasoline taxes, registration fees, tolls and local taxes making up the balance.

Although expenditures for road construction in 1949 ballooned 120 per cent over the figure for 1940, the actual physical volume of construction was almost identical and, incidentally, far below even the most conservative estimates of current requirements.

Automotive rail freight in 1949 was estimated to aggregate 3,811,000 carloads, of which 271,000 carloads were iron and steel.

Ford Builds Kansas City Plant

Plans for a new Kansas City, Mo., assembly plant have been developed by Ford, the project to have daily capacity of 700 cars and trucks, employing about 3000 and scheduled to start early in 1952. It will replace the present plant which has been in operation for 38 years and is now turning out 400 cars and trucks daily. Excavations will be started at once at the new 150-acre site 12 miles from downtown Kansas City.

Also on the Ford plant agenda is an extensive parts depot modernization program, eight separate units coming under the program. Major improvements include floor flush conveyor systems, modern materials handling equipment, rearrangement of stocks and improved working conditions. The depots, at Omaha, Oklahoma City, Salt Lake City, New Orleans, Denver, Des Moines, Jacksonville, Fla., and Richmond, Calif., also will stock a greater range of service parts.

Ford's automatic transmission plant in Cincinnati, now in operation after many unexpected delays, will be christened formally the latter part of October. Into its construction have gone many of the latest ideas for optimum working conditions—air conditioned final assembly sections, modern medical department, improved locker and shower rooms, fenced and paved parking areas, nonskid floors, glare-reducing windows, dust and paint fume disposal systems, air-conditioned cafeteria, and a plant-wide ventilating system that replaces 250,000 cubic feet of air every minute.

Auto, Truck Output

U. S. and Canada

	1950	1949
January	609,882	445,092
February	505,593	443,734
March	610,678	543,711
April	585,705	569,728
May	732,161	508,101
June	897,864	523,689
Six Months	3,941,883	3,034,055
July	746,771	604,351
August	840,000*	678,092
September		657,073
October		601,021
November		474,731
December		384,318
Total		6,533,641

Weekly Estimates

Week Ended	1950	1949
Aug. 19	190,879	149,359
Aug. 26	179,042	155,367
Sept. 2	188,264	146,039
Sept. 9	150,000	123,806

Estimates by Ward's Automotive Reports

* Preliminary.

Allison Leases Indianapolis Plant

Allison Division of General Motors has leased a vacant building in Indianapolis, formerly occupied by Fairbanks-Morse and now owned by Chrysler, for production of a new tank transmission. It will be of the hydraulically controlled torque converter type.

Reconditioning of the 215,000 square foot facility has started and machinery will be moved in as quickly as possible so that production of parts can be under way before the end of the year. Assembly and testing of the transmission will be carried out in Allison Plant 3 where an area of 100,000 square feet is now being cleared.

The transmissions will be installed, of course, in the tank which Cadillac is to build at Cleveland. It is similar to the transmission which Allison has been building the past year for installation in the M46 General Patton tank.

Lease of the Indianapolis building gives Allison six separate plants in the city, with floor area of more than 4 million square feet. That's in excess of the space occupied by the division during its World War II peak.

Rausch Joins Willys-Overland

Raymond R. Rausch, at one time a top production official of Ford Motor Co., later associated for a brief period with the Tucker automobile building fiasco and for the past several years a vice president of General Electric, has been named vice president and executive assistant to the president of Willys-Overland.

Rausch is regarded as one of the country's foremost manufacturing specialists in the techniques of mass production and cost control. He represented Ford in dealings with the government on military contracts in the last war and should strengthen the Willys executive management in future business of this sort.

Ward M. Canaday continues to hold the reins at Willys as president and board chairman and, in addition to bringing in Rausch, has made other staff realignments in recent weeks, including the installation of Clyde R. Paton, a former Packard chief engineer and later with Studebaker and Ford, as director of engineering. C. E. Sorenson, a close associate of Rausch in years gone by at Ford, still serves Willys under the intriguing title of vice chairman of the board.

This week Willys is announcing a new all-steel 4-wheel drive station wagon with increased "gradeability" of up to 15.4 per cent over the previous model. For highway use, it can be driven in the conventional 2-wheel drive, with 4-wheel drive reserved for the off-the-road type of operations.

The unit can negotiate grades of 66.73 per cent in low gear, low range, and 8.52 per cent in high gear, high range. Engine is 4-cylinder 72-horsepower.

ARISTOLOY STEELS

HIT THE MARK

In electric furnace melting scrap is the basic metallic charge. Quality of steel is dependent upon this vital ingredient. Every use of scrap is thoroughly sampled—determinations are made for the various alloys, chemicals and impurities in question.

ARISTOLOY STEELS

STANDARD STRUCTURAL ALLOY
BEARING QUALITY • ALLOY TOOL
SPECIALTY • NITRALLOY
CARBON TOOL • STAINLESS
MAGNAFLUX— AIRCRAFT QUALITY

COPPERWELD STEEL COMPANY, WARREN, OHIO

117 Liberty Street
New York, New York

176 W. Adams Street
Chicago, Illinois

P. O. Box 1633
Tulsa, Oklahoma

1578 Union Commerce Building
Cleveland, Ohio

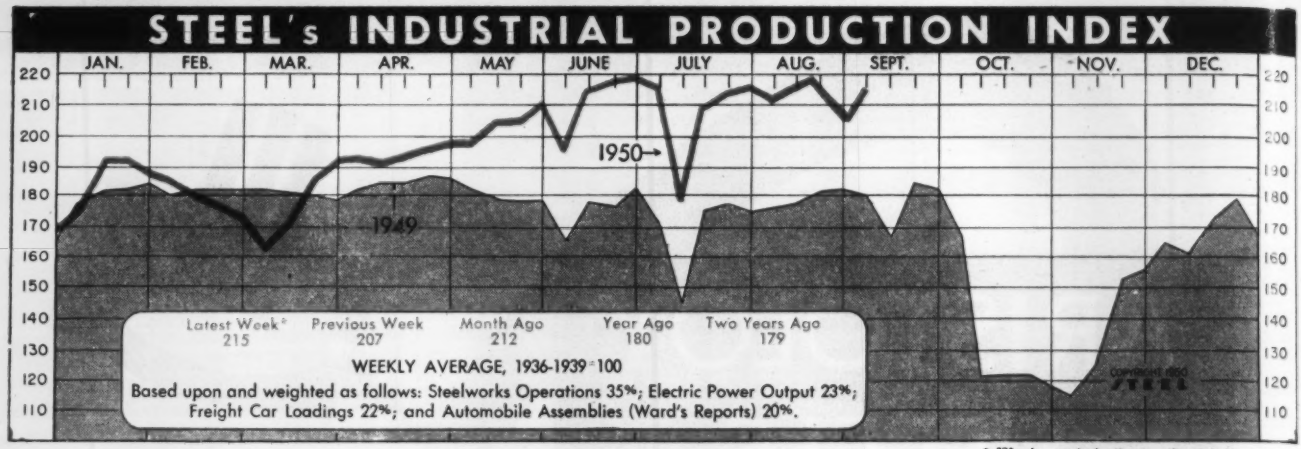
7251 General Motors Building
Detroit, Michigan

403 W. Eighth Street
Los Angeles 14, California

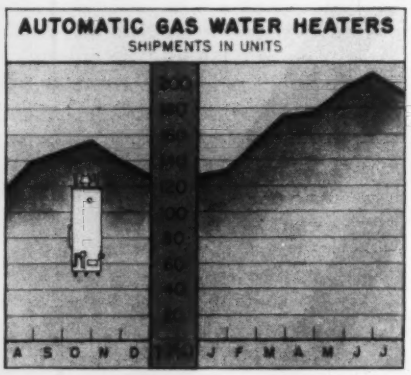
528 Fisher Building
Detroit, Michigan

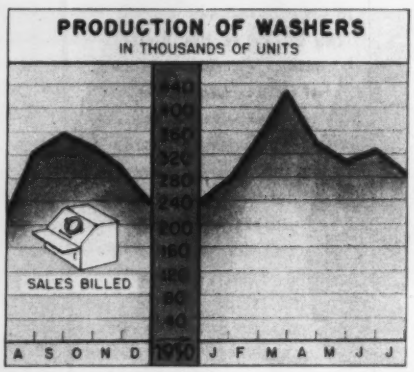
3104 Smith Tower
Seattle, Washington

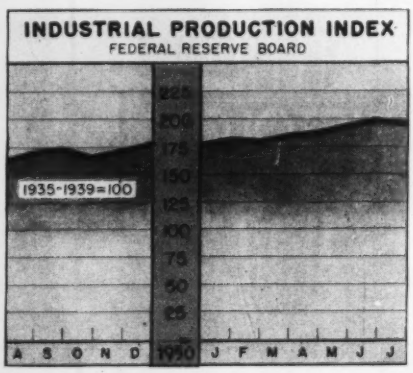
Monadnock Building
San Francisco 5, Calif.



* Week ended Sept. 2 (preliminary)







Charts—Copyright 1950, STEEL

Automatic Gas Water Heaters

Shipments in Units

	1950	1949	1943
Jan.	131,600	88,400	126,600
Feb.	154,000	84,500	110,900
Mar.	172,800	106,000	131,600
Apr.	176,400	115,200	134,100
May	195,200	120,200	118,600
June	205,400	132,200	122,000
July	194,800	114,400	121,300
Aug.	.....	138,800	160,200
Sept.	.....	147,300	149,300
Oct.	.....	154,200	127,500
Nov.	.....	133,300	109,000
Dec.	.....	126,500	88,900

Gas Appliance Mfrs. Assoc.

Household Washers

Sales Billed—Units

	1950	1949	1948
Jan.	275,576	172,400	360,445
Feb.	342,967	201,300	367,909
Mar.	423,802	242,600	403,512
Apr.	333,062	192,500	402,257
May	304,640	211,700	347,895
June	325,217	260,700	392,496
July	282,261	200,900	326,181
Aug.	.....	323,789	362,160
Sept.	.....	357,281	433,919
Oct.	.....	333,728	382,400
Nov.	.....	298,717	319,300
Dec.	.....	237,591	183,100
Totals	.....	3,033,106	4,317,183

American Washer & Ironer Mfrs. Assoc.

Industrial Production Indexes

	Total Production		Iron, Steel		Non-ferrous	
	1950	1949	1950	1949	1950	1949
Jan.	193	191	203	228	179	184
Feb.	181	189	201	232	188	185
Mar.	187	184	205	233	199	183
Apr.	190	179	222	219	196	163
May	195	174	226	204	195	145
June	199	169	231	177	207	132
July	197	161	228	156	202	123
Aug.	....	170	...	178	...	141
Sept.	....	174	...	179	...	157
Oct.	....	166	...	103	...	164
Nov.	....	173	...	144	...	163
Dec.	....	180	...	198	...	165
Avg.	....	176	...	187	...	160

Federal Reserve Board

Issue Dates of Other FACTS and FIGURES Published by STEEL:

Construction Aug.28	Gray Iron Sept.4	Ranges, Gas Sept.4
Durables Aug.28	Ironers Aug.21	Refrigerators Aug.21
Employ., Metalwkg.Aug.21	Machine Tools Aug.28	Steel Castings Aug.21
Employ., Steel Aug.21	Malleable Cast. Aug.28	Steel Forgings Aug.7
Fab. Struc. Steel...Sept.4	Price Indexes Sept.4	Steel Shipments....Aug.28
Freight Cars Aug.14	Purchasing Power..Sept.4	Trucks, Elec. Ind...Jan.2
Furnaces, W. Air...Aug.14	Radio, TV Aug.14	Wages, Metalwkg...Aug.21
Furnaces, Indus. ..Aug.14	Ranges, Elec. Aug.28	Vacuum Cleaners..Sept.4

Water Heaters Head for Record

Gas water heater shipments are heading for a new yearly record on the strength of the first seven months' performance. Gas Appliance Manufacturers Association says the seven months total reached 1,232,700 units. This is an increase of 62 per cent over the same period a year ago and 14.6 per cent greater than shipments during the first seven months in 1947, the industry's peak year.

Monthly shipments of automatic gas water heaters established new peaks during four consecutive months this year: March, April, May and June. Although July shipments declined to 194,800 units from 205,400 in June, they are the third best in history trailing only May and June.

Shipments of electric (storage) water heaters are also high and totaled 474,000 units in the first six months. Continuation of the building boom will mean good business for water heater manufacturers for the remainder of this year.

Washer Sales Slide

Although factory sales of household washers slipped noticeably in July from the previous month's total, they were more than 40 per cent higher than in the corresponding month a year ago. American Home Laundry Manufacturers' Association reports July sales totaled 282,261 units, the June total was 325,217 and the July, 1949, aggregate was 200,900.

Dryers sold in July totaled 23,588 units, compared with 20,568 in June, an increase of 14.7 per cent. The latest total is 750 per cent over the 2775 units sold in July a year ago. Ironer sales in July aggregated 25,100 units, down 7.4 per cent from 27,100 in the preceding month but up 42 per cent over 17,700 in July a year ago.

The Business Trend

If it's made of metal then it will cost more in coming months. That's a pretty safe assumption as wage rates keep rising in more and more plants

MORE price rises in metalworking lines are inevitable. Wage increases will be passed on to customers whether they be other metalworking companies or ultimate consumers. Wage raises granted by major automotive builders are spreading to suppliers. Steel wage talks are in the offing, and once an increase in granted in steel all other metalworking companies will have to fall in line. So the price spiral gets another boost upward.

Last week metalworking and metalproducing companies took a small breather while gathering their strength for the usual fall assault on production targets. In the week ended Sept. 2 STEEL's industrial production index climbed 8 points to a preliminary 215 per cent of the 1936-1939 average.

Operations Stay High . . .

Steelmaking furnaces operated at a high rate last week despite the holiday. With demand strong from all segments of the metalworking industry the steel industry couldn't afford to ease up on its outpouring of steel for ingots and castings. In the week ended Sept. 2 the steelmaking rate rose 7.5 points over the preceding week to 97.5 per cent of capacity.

Auto Wages Up . . .

First General Motors, then Chrysler and finally Ford among the industry's Big Three announced pay boosts. Some independents and major suppliers have also granted wage increases to employees. These grants should do much toward eliminating the wildcat stoppages that have been a thorn in the side of automotive production. Another difficulty still remains to give the auto companies trouble. Materials shortages will keep the auto makers from reaching the assembly level attained in June. In the week ended Sept. 2 outturn rose to 188,264 passenger cars and trucks from 179,042 units in the preceding week.

Construction Rebounds . . .

Blowing alternately hot and cold, construction awards were on a hot streak in the week ended Aug. 31 after sagging for most of the month. Awards in the latest week reported totaled $342.5 million for the third best mark this year. The total is 50 per cent higher than the average week date this year and 120 per cent higher than the corresponding week last year. Industrial building totaling $73 million, private housing at $81.5 million and unclassified construction at $59 million account for the high volume.

Credit Increases . . .

July's war-inspired credit rush pushed total consumer credit to $20,340 million at the end of the month, a gain of $660 million. The gain was larger than for any other July on record and exceeded the substantial increases occurring in the two preceding months. Installment credit rose $500 million during the month to $12,608 million. Much of

BAROMETERS of BUSINESS

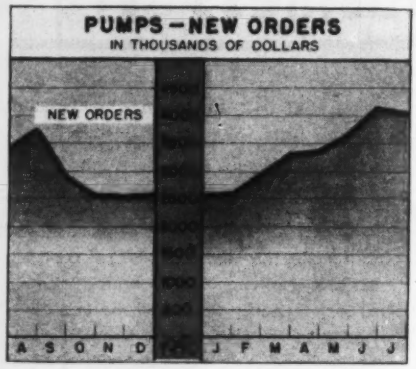
		LATEST PERIOD*	PRIOR WEEK	MONTH AGO	YEAR AGO
INDUSTRY	Steel Ingot Output (per cent of capacity)†	97.5	90.0	99.5	86.0
	Electric Power Distributed (million kilowatt hours)	6,350‡	6,346	6,247	5,544
	Bituminous Coal Production (daily av.—1000 tons)	1,817	1,873	1,789	1,315
	Petroleum Production (daily av.—1000 bbl)	5,720‡	5,699	5,640	4,820
	Construction Volume (ENR—Unit $1,000,000)	$342.5	$198.8	$209.3	$155.2
	Automobile and Truck Output (Ward's—number units)	188,264	179,042	175,572	146,039
TRADE	Freight Car Loadings (Unit—1000 cars)	840†	837	837	704
	Business Failures (Dun & Bradstreet, number)	172	176	168	174
	Money in Circulation (in millions of dollars)‡	$27,042	$26,963	$27,000	$27,389
	Department Store Sales (changes from like wk. a yr. ago)‡	+15%	+12%	+42%	−1%
FINANCE	Bank Clearings (Dun & Bradstreet—millions)	$16,136	$15,404	$15,269	$11,321
	Federal Gross Debt (billions)	$257.8	$257.8	$257.6	$255.9
	Bond Volume, NYSE (millions)	$11.8	$15.6	$20.7	$10.0
	Stocks Sales, NYSE (thousands of shares)	6,698	8,198	8,803	3,535
	Loans and Investments (billions)†	$68.2	$68.1	$68.0	$65.1
	United States Gov't Obligations Held (millions)†	$34,894	$35,078	$35,727	$37,114
PRICES	STEEL's Weighted Finished Steel Price Composite††	156.99	156.99	156.69	152.52
	STEEL's Nonferrous Metal Price Index‡	205.2	206.8	194.9	180.3
	All Commodities†	167.2	166.0	165.3	153.0
	Metals and Metal Products†	174.8	174.9	173.9	168.2

*Dates on request. †1950 weekly capacity is 1,926,803 net tons. 1949 weekly capacity was 1,843,516 net tons. ‡Preliminary.

†Preliminary. ‡Federal Reserve Board.

†Member banks, Federal Reserve System.

†Bureau of Labor Statistics Index, 1926=100. ‡1936-1939=100. ††1935-1939=100.

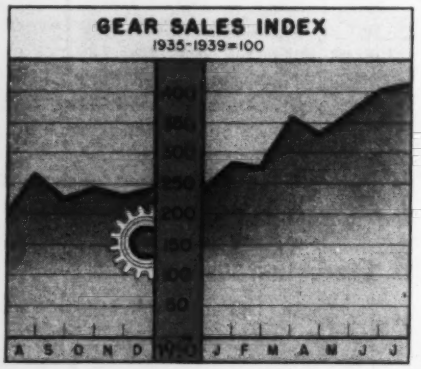


Pumps, New Orders

In Thousands of Dollars

	1950	1949	1948
Jan.	2,586	3,390	3,819
Feb.	2,938	3,247	3,635
Mar.	3,313	3,593	4,703
Apr.	3,376	2,699	4,312
May	3,668	2,775	3,724
June	4,153	3,019	3,512
July	4,080	3,358	4,075
Aug.	....	3,767	4,520
Sept.	....	2,914	3,474
Oct.	....	2,539	3,571
Nov.	....	5,525	3,580
Dec.	....	2,560	4,263
Total	....	36,386	47,188

Hydraulic Institute

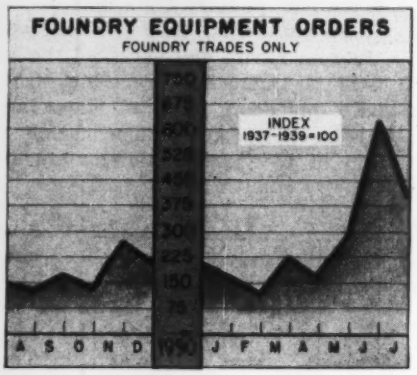


Gear Sales Index

1935—1939=100

	1950	1949	1948
January	280.2	320.7	346.8
February	272.9	282.3	324.4
March	358.4	299.1	389.8
April	328.6	339.0	320.9
May	363.1	250.1	283.6
June	401.0	227.8	324.1
July	410.7	193.1	384.4
August	....	262.0	335.6
September	....	224.9	320.4
October	....	242.3	333.3
November	....	230.7	309.0
December	....	242.8	325.9

American Gear Mfrs. Assoc.



Foundry Equipment Orders

	Index		Value in Thousands	
	1950	1949	1950	1949
Jan.	159.3	149.9	$731	$694
Feb.	113.1	144.4	519	668
Mar.	225.2	190.8	1,034	883
Apr.	160.6	172.0	737	797
May	294.9	121.9	1,353	565
June	622.7	164.9	2,858	764
July	401.8	146.6	1,844	679
Aug.	....	127.1	....	589
Sept.	....	166.6	....	772
Oct.	....	133.5	....	618
Nov.	....	270.4	....	1,250
Dec.	....	201.0	....	929

Foundry Equipment Mfrs. Assoc.

Charts—Copyright, 1950, STEEL

this unprecedentedly large gain occurred in the automotive segment which at the month end amounted to $3994 million. An accelerated rate of growth in other sale credit reflected the initial heavy buying in major durables.

Faster Order Pace . . .

New orders received by manufacturers in July increased $700 million over June and reached $20.8 billion. Commerce Department says this total does not reflect increases in orders for the largest aircraft producers. For other durables producers new business exceeded the June peak by $200 million. Total for all durable goods industries was $10.7 billion. Inventories during July, in contrast to the sizable increase in recent months, showed no change in total manufacturers' book values. On a seasonally adjusted basis inventories for all manufacturing industries totaled $32 billion and for durable goods industries $14.4 billion. Sales during July aggregated $19.9 billion, above June when allowance is made for seasonal factors.

Prices Advance . . .

Bureau of Labor Statistics wholesale price index continued to advance in the week ended Aug. 29. It moved up 0.7 per cent to 167.2 per cent of the 1926 average. The latest figure is 9.3 per cent higher than in the comparable week a year ago and is exceeded in the postwar period only by the months in the third quarter of 1948.

Employment at New High

Worker supply dwindling fast due to both defense and non-defense activity

PLANNING to expand your workforce? If you are, then you probably already know that skilled help is scarce and that the supply of unskilled workers is dwindling. Commerce Department's estimate of August employment places the number of job holders at 62,367,000, the highest point in history. It is 1 million above the July figure and 750,000 higher than the previous peak of 61,617,000 reached in July, 1948. All the rise came in non-farm work and most of it centered in factory employment.

Expressing surprise at the big increase in jobholders from July to August, the Commerce Department attributes it partly to expanded activity due to the Korean War. But, the department adds, expansion in non-defense industries also contributed to the employment increase.

Fewer Jobless—The number of persons without jobs fell off sharply from 3.2 million in July to 2.5 million in August. The latest figure is the lowest since early 1949 when the postwar boom first began to show signs of tapering off. Unemployment began a slow rise at that time until it reached as high as 4 million in late 1949 and early 1950.

Commerce Secretary Sawyer commenting on the new figures said the economy was gradually moving toward full employment before the Korean crisis and with increasing defense preparations it may be expected that this trend will continue at an accelerated pace. It is the accelerated pace mentioned by the commerce secretary that is causing many manufacturers a lot of concern. They are dusting off World War II techniques for recruiting and training help with an eye to using at least the best features in the future.

No Problem Now—Improvement in an area that caused Commerce a great deal of concern for over a year was also noted. This tender spot was the number of people out of work for long periods of time. August's report lists 550,000 people who had been out of work for four months or longer. This figure was as high as 1,250,000 in April this year.

Sundstrand's Sales Rising

Improved business for all divisions of Sundstrand Machine Tool Co., Rockford, Ill., has raised its backlog to $10.5 million, one-third higher

than it was at the first of the year. In addition to its backlog the company has substantial orders for 1951 delivery not included in the reported total backlog.

Machine tool business is on the upgrade and most of the orders for this division come not from defense work but from the automotive industry. The hydraulic division is showing an increase in orders for military airplane equipment but a bigger help to sales and backlogs is the demand for oil burner pumps used in home and industrial heating equipment. Sunstrand has four new products in this field that are expected to help materially with sales and profits.

Sold Out for the Year

Kalamazoo Stove & Furnace Co.'s president, A. L. Blakeslee, reports his company is sold out for the year. July and August sales were at a hectic pace due to a certain amount of scare buying, he says. Whether or not the company will be able to maintain production schedules depends on availability of materials, especially steel.

While there is lots of business on the books, earnings for the year are impossible to judge because of materials shortages and higher prices. Mr. Blakeslee reports paying $200 to $275 per ton for hot and cold-rolled steel which sells at the mill for $100. The company uses about 2000 tons of steel a month.

Construction Still Booms

Construction put in place in August set another alltime high topping the former record set one month earlier, a joint report by the Commerce Department and Bureau of Labor Statistics shows. Private construction was $2012 million and public construction $718 million for a $2730 million total.

Value of private residential building put in place during August is estimated at $1250 million, 60 per cent above August, 1949. It accounted for more than 60 per cent of total private outlays for new construction.

Public housing expenditures rose to $27 million in August after a dip in July resulting from virtual cessation of progress on New York City Housing Authority projects caused by the truck drivers' strike.

Industrial building continued its recent gains and the volume of work on new warehouses and office buildings rose substantially. Highway construction advanced by 11 per cent to $300 million in August, compared with $275 million a year ago.

Construction put in place during the first eight months this year is one-fifth higher than in the corresponding period in 1949. Private outlays are 25 per cent higher and public expenditures are up 9 per cent.

Metals Supply Is Problem for Trailer Builders

POWER-plus may be necessary to climb the production hill this year but truck trailer manufacturers are pushing the accelerator to the floor in an effort to make the grade. Orders are being placed thick and fast by truck fleet operators but metals shortages may be a road block.

June production was highest for any month since March, 1947, and totaled 5532 units. Outturn in July was slowed by plant vacations but orders came flooding in to the 99 companies engaged in truck trailer manufacture. Preliminary reports covering August indicate that order volume and production were both high. Census Bureau's tabulation on truck trailer production in the first half shows 25,755 completions.

Choice Items Gone—Factory shipments in the first half totaled 26,270 units valued at $89.6 million. The fact that shipments exceeded production shows buyers were eating into factory stocks during the period. Since the outbreak of hostilities in the Orient, factory stocks have virtually melted away and truck trailer manufacturers are generally working on firm orders.

Two factors are responsible for the buying surge and both result from the Korean war. Trailer fleet operators are closing orders that otherwise would have been subject to further study in order to beat rising prices, they are sure it will cost them money to wait. During World War II civilian trailers were available in limited quantities and then only to shippers directly engaged in war work.

Pinch Will Get Worse—Steel is currently the tightest item for trailer builders but aluminum's future looks even worse. Since weight savings are all important in trailer construction, builders use aluminum in large quantities especially in van and tanker construction. An accelerating aircraft construction program will make this already hard-to-get metal even tighter.

Should scarce metals be allocated, truck trailer manufacturers hope they will be included in the program. They realize freight cars will get top billing in the transportation group but they feel that trailers and barges are deserving of a helping hand. In the period following World War II trailer builders were not allocated any steel.

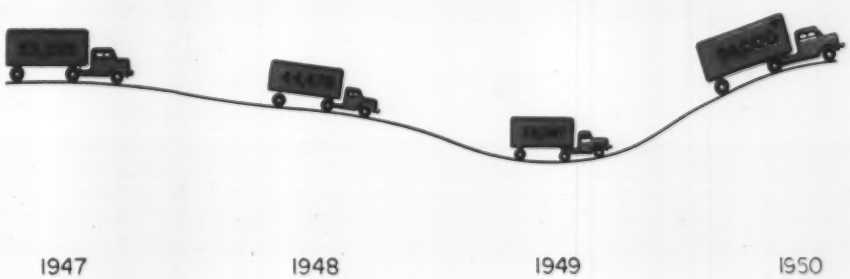
The Truck Trailer Manufacturers Association says this was because the Office of Defense Transportation felt that as a part of the automotive industry they were able to take care of themselves. Unfortunately, the association explains, most companies building trailers are not large and will need help if they are to supply essential needs.

Follow the Leader—Wage contracts are being negotiated by companies and will probably follow the pattern set by the auto industry. Increases granted by automotive firms in normal contract negotiations or as special grants will have to be met. Some companies who have already signed contracts will not escape wage increases sought by the unions as the result of rising prices.

Employment in the industry has gone up in the last two months. Most plants are still operating on a single-shift basis but there is more overtime and Saturday work.

Trailers Climbing to Four-Year Output High

. . . Military needs may be a road-block for plans



* Estimated by Truck Trailer Mfrs. Assoc.

Men of Industry

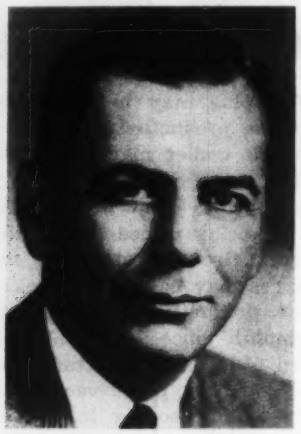
JOHN A. DECKER
. . . Carborundum sales mgr., New York

John A. Decker was appointed sales manager, New York district, **Carborundum Co.**, Niagara Falls, N. Y. **William J. Kingsley** was appointed assistant sales manager, bonded products and grain division, with headquarters in Niagara Falls. Mr. Decker, with the company since 1933, held the position of assistant sales manager, New York district, prior to his present appointment. **Thomas Curtiss,** field sales representative, Buffalo district, was transferred to the central New York area and is succeeded by **Edgar T. Harris. George Dennison** was named a special sales engineering representative for New York state, with headquarters in Buffalo.

R. K. Mangan, formerly executive vice president, was elected president of **Buda Co.**, Harvey, Ill. He succeeds the late **J. S. Dempsey. K. E. Fitzpatrick,** secretary, was named to succeed Mr. Dempsey as treasurer.

M. C. Larson was appointed manager of the Baltimore office of **Cutler-Hammer Inc.**, replacing **R. A. Haworth,** appointed Dallas district sales manager. The Baltimore office will continue as part of the Philadelphia district sales office under **J. P. Simon.** Mr. Larson served in the latter office for the last two and one half years.

Walther L. Havekotte, formerly research engineer at Battelle Memorial Institute, Columbus, O., where for the last five years he worked with high-temperature alloys, has joined **Firth Sterling Steel & Carbide Corp.**, McKeesport, Pa., as assistant manager of research.



RAYMOND W. AYERS
. . . V. P. at Frederick Hart & Co. Inc.

Raymond W. Ayers was elected vice president, **Frederick Hart & Co. Inc.**, Poughkeepsie, N. Y., manufacturer of electronic sound recorders and precision mechanisms, and a subsidiary of ATF Inc. Mr. Ayers, who has been with the Hart company since 1947, maintains headquarters in Washington. He had previous association with Moore Business Forms Corp. and Addressograph-Multigraph Corp.

Russell J. Dickson was appointed district manager for the Chicago territory by **A. Leschen & Sons Rope Co.**, St. Louis. He succeeds **Mark Arnold,** retired after 47 years of continuous service.

Burch Corp., Crestline, O., manufacturer of road building machinery, etc., elected **E. R. Standfuss** president and general manager. He was general manager of Shunk Mfg. Co. **J. L. Morrow** continues active at Burch as chairman of the board.

W. J. Binder was appointed manager, engineering service department, **A. M. Byers Co.**, Pittsburgh.

R. M. Frink was appointed Detroit plant manager, **Wolverine Tube Division,** Calumet & Hecla Consolidated Copper Co. Inc. He is succeeded as customer relations manager by **V. A. Zatell,** who has supervised the production planning department and was recently appointed a member of the divisional control group. In both positions Mr. Zatell is succeeded by **E. G. Wojack,** formerly in charge of production planning at the Decatur, Ala., plant. All three men will have headquarters in Wolverine's Detroit plant.

ALAN R. MENDENHALL
. . . sales mgr., steel bldg. div., Steelcraft

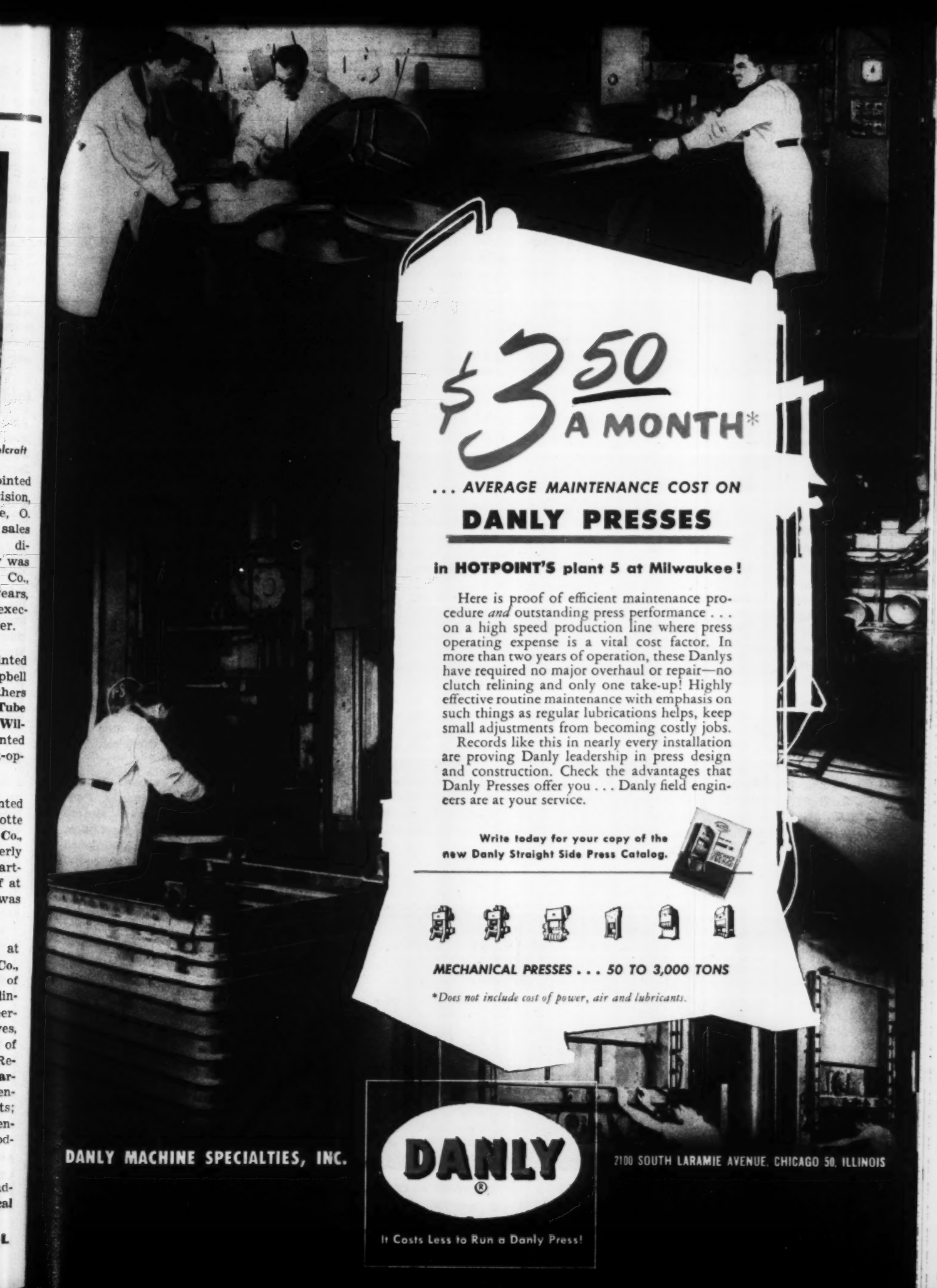
Alan R. Mendenhall was appointed sales manager, steel building division, **Steelcraft Mfg. Co.**, Rossmoyne, O. **Nat L. Lehman** continues as sales manager, building products division. Mr. Mendenhall formerly was associated with Geo. L. Mesker Co., Evansville, Ind., for over 30 years, and for the last four years was executive vice president and manager.

Thomas A. Cleary Sr. was appointed general superintendent, Campbell Works steel plant and Struthers works, **Youngstown Sheet & Tube Co.**, Youngstown. He succeeds **William H. Yeckley** who was appointed an assistant to the vice president-operations.

Francis E. Murphy was appointed production supervisor, Wyandotte Works, **Pennsylvania Salt Mfg. Co.**, Philadelphia. **John Bogen,** formerly with Pennsalt's production department in Philadelphia and the staff at the Calvert City, Ky., plant, was transferred to Wyandotte.

Promotions to engineering posts at **Reliance Electric & Engineering Co.**, Cleveland, include appointment of **John L. Fuller** as technical co-ordinator with responsibility for engineering co-ordination of special drives, technical investigations, analysis of special projects, and direction of Reliance's experimental program; **Charles R. Sutherland** as manager of engineering, Ivanhoe division products; and **Earl C. Barnes,** manager of engineering, Ashtabula division products.

Charles B. Denton was appointed advertising manager, **Weston Electrical**



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Instrument Corp., Newark, N. J., succeeding **Philip Barnes,** now general sales manager.

Dr. Gustavus J. Esselen, vice president, United States Testing Co. Inc., was elected vice president of the **Society of Chemical Industry,** which maintains its headquarters in London, England. Dr. Esselen has been chairman of the American section of the society for the last year, and continues in this capacity in addition to his new duties as vice president. He is in charge of the Esselen Research Division of United States Testing Co. Inc., in Boston.

Newly named sales representatives to the general machinery division offices of **Allis-Chalmers Mfg. Co.** are **Donald H. McIntosh** and **Kenneth V. Knudsen** at Chicago; **Delpherd H. Verhein,** Milwaukee; and **Daniel Boland,** Davenport, Iowa.

Warren Frebel joined **Majestic Radio & Television Inc.,** Brooklyn, N. Y., as purchasing agent.

C. J. Niles was appointed factory superintendent of factory operations for the Milwaukee bottle filler and capper division, **Cherry-Burrell Corp. C. S. Holst** was named production supervisor.

Clark Controller Co., Cleveland, announces promotions as follows: **Robert H. Whitehill,** former manager, Pittsburgh office, becomes manager, Cleveland district sales office. **H. B. Stallings,** previously Buffalo manager, is now manager at Pittsburgh. **Harry M. Cook** of the Birmingham office, is named manager, Buffalo area. **William R. Heckman** moves from Syracuse, N. Y., to be manager at Akron; **John D. Puette,** manager of industrial sales in the home office, becomes district engineer in the Cleveland sales office; and **John W. Fox** is named manager of applied engineering in the home office.

Lester Castings Inc., Cleveland, appointed **Ernest F. Karbe** sales representative and service engineer for New York state. His appointment is part of an expanding program of field engineering service by Lester Castings for users of zinc and aluminum die castings. With 20 years of experience in plant management, production and development of diverse machinery, parts and instruments, Mr. Karbe's background includes a number of years as superintendent of manufacturing at Curtiss-Wright Corp., and works manager for Roberts-Gordon Appliance Corp.

Three appointments in the San Jose, Calif., motor divisions of **General Electric Co.'s** small and medium motor divisions are: **Charles Stoeckly** as manager, sales division; **Carl J. Andersen,** manager, manufacturing division; and **L. A. March,** manager, engineering division.

Berry Motors Inc., Corinth, Miss., elected **Theodore F. Smith,** president, Oliver Iron & Steel Corp., as a director and as chairman of the board. **Ara A. Cambere** was elected president, replacing **Frank Berry,** who became vice president in charge of research. Mr. Cambere and Mr. Berry were also re-elected directors. Newly elected members of the board of directors are **Paul H. Startzman,** general works manager, Oliver Iron & Steel Corp.; **Norton V. Coyle,** vice president, Tyrone Corp.; **O. F. Quartullo,** president, Visioneering Co. Inc.; and **C. Reid Bondurant.**

HARRY L. JENTER
. . . chief engineer, American Steel & Wire

Nelson W. Dempsey, general superintendent, Waukegan, Ill., plant, **American Steel & Wire Co.,** Cleveland, subsidiary, U. S. Steel Corp., was named to a similar post at the Cuyahoga Works of the company in Cleveland. He fills the vacancy created by appointment of **Harry L. Jenter** as chief engineer of the company (STEEL, Sept. 4 issue, p. 81). **James E. Brown,** assistant general superintendent at Cuyahoga Works, succeeds Mr. Dempsey at Waukegan. Establishment of new positions in two divisions of the company's sales department include appointment of **Walter C. Anderson** as assistant manager, construction materials products sales division; and **Earl N. Graf** as assistant manager, wire rope products sales division. Both men will have headquarters in Cleveland.

G. F. McInally was named Minneapolis assistant zone manager, **Pontiac Motor Division,** General Motors Corp. He replaces **Tom A. Cullen,** transferred in the same capacity to the Los Angeles zone. Mr. McInally, formerly Buffalo zone business management manager, is succeeded by **W. W. Harris,** service manager at Buffalo. Mr. Cullen succeeds **Paul Stone** who resigned to enter private business.

N. G. Sixt was named technical assistant to **Fred P. Hauck,** vice president of **Michigan Abrasive Co.,** Detroit. Mr. Sixt is a former process engineer, Carborundum Co.

Westinghouse Electric Corp., Pittsburgh, appointed **J. M. Wallace** manager, switchgear distribution apparatus department, a unit of the Westinghouse East Pittsburgh Works. **E. F. Coy** was named manager, application engineering department; **G. R. Kepner,** director of pro-

ROBERT H. WHITEHILL
. . . mgr. Cleveland district

H. B. STALLINGS
. . . mgr. at Pittsburgh Clark Controller Co.

HARRY M. COOK
. . . mgr. at Buffalo

duction, Atomic Power Division; and **E. C. Hanks,** sales manager, gearing division.

Baird Hodgkinson was appointed ignition sales engineer, **Simmonds Aerocessories Inc.,** Tarrytown, N. Y. He formerly was associated with the A. C. Spark Plug Division, General Motors Corp. and Pratt & Whitney Aircraft.

An expanded factory branch to serve industry in Cleveland and northern Ohio was opened by **Yale & Towne Mfg. Co.** and **Douglas L. Darnell** was named district sales manager. He formerly was vice president in charge of sales, Baker-Raulang Co., Cleveland. Serving as sales representatives are **A. P. Carstensen,** and **J. R. Hogan,** formerly with Ohio Equipment Co., distributor for Yale & Towne. **Clarence Weidner** will be service manager; **E. J. Werner,** Akron representative; and **F. X. Vogel** is district manager, hoist division.

Kenneth W. Lineberry, a member of the board of directors, who for the last few weeks has been serving as chief executive officer for **Black, Sivalls & Bryson Inc.,** Kansas City, Mo., was elected president to succeed **A. J. Smith,** resigned. Mr. Lineberry announced his resignation as vice president and director, F. S. Yantis & Co., Chicago, with which he has been associated for the last 17 years.

E. J. Basch was elected vice president in charge of production, **Western Die Casting Co.,** Emeryville, Calif. **Miss Jane Leland** was named controller.

American Car & Foundry Co., New York, elected as vice presidents **James F. Clark,** who is treasurer; and **Phillips B. Hoyt,** who is director of purchases. **John C. Coonley** was appointed manager of the valve division succeeding **W. R. Kottsieper,** retired after 44 years' service.

ATWOOD AUSTIN
. . . new vice president, Kaiser Steel

C. F. BORDEN
. . . new vice president, Kaiser Steel

Kaiser Steel Corp., Oakland, Calif., elected as vice presidents **Atwood Austin** and **C. F. Borden.** Mr. Austin, formerly financial consultant for several of the Kaiser companies, was made vice president and treasurer of the steel firm. Mr. Borden, general sales manager of Kaiser since 1947, was named vice president in charge of sales.

Roy W. Maze was promoted to merchandising sales manager, **Marley Co. Inc.,** Kansas City, Kans., producer of water cooling equipment. He joined the company in 1946 as public relations director, the position he held until his promotion.

Changes in the management of the product service division, **A. O. Smith Corp.,** Milwaukee, include: **J. J. Bohmrich,** former manager of the division, now named group executive over the product service, railroad products and welding electrode and equipment divisions. He is succeeded as manager, product service, by **J. W. Spoor,** former assistant manager, who also will direct operations of the Chicago product service branch. **E. R. Dickinson,** former Chicago branch manager, is transferred to the eastern branch at Union, N. J., as manager succeeding **C. L. Tracey,** who has moved to the New York district office in LPG sales in the home appliance division. At the Dallas branch, **J. A. Snyder Jr.** was named manager succeeding **D. R. Neff,** resigned.

Division of the United States into two primary sales areas and appointment of a vice president in charge of sales for each was announced by **McAllister-Ross Corp.,** Chicago, manufacturer of bagless household vacuum cleaners. **Hadden S. Pierce,** former division sales manager, Interstate Engineering Corp., El Segundo, Calif., will have charge of western sales. **William A. Wallace,** former president, Chieftain Sales Co., Chicago, will be in charge of eastern sales.

Promotions of three executives of Youngstown plants of **Carnegie-Illinois Steel Corp.** are: **Charles C. Eppley,** made assistant division superintendent of maintenance, succeeding **W. A. Anderson,** resigned. **Howard C. Goodrich** becomes superintendent, utility division, replacing Mr. Eppley, and **C. C. O'Brien** becomes assistant superintendent of the company's utility division.

OBITUARIES...

G. R. Gibbons, 71, a pioneer in the development of the aluminum industry and a director of **Aluminum Co. of America,** Pittsburgh, died Sept. 3. He started a 48-year career with Alcoa in 1901 as a chemist in its plant at New Kensington, Pa., and was senior vice president in charge of sales in 1949 when he retired.

Dr. Loyal A. Shoudy, 70, medical director, **Bethlehem Steel Co.,** Bethlehem, Pa., died Aug. 30. A pioneer in industrial medicine, he had been with Bethlehem Steel since 1914.

Robert W. Roberts, 76, board chairman and one of the organizers of **Milwaukee Forge & Machine Co.,** Milwaukee, died Aug. 27 following a heart attack. He served as president of the firm for several years and was vice president and treasurer as well as board chairman at time of his death.

William P. Breeding, 74, a founder and last member of the original board of directors of **Monroe Calculating Machine Co.,** Orange, N. J., died Aug. 28. Two years after the company was founded in 1911 he was elected treasurer. In 1927 he was named secretary and when he retired in 1929 he was a vice president.

Thomas H. Banfield, 64, president, **Iron Fireman Mfg. Co.,** Cleveland, died Aug. 31 of a heart attack while on a fishing trip in Oregon. He resided in Portland, and was also president and director of Portland Wire & Iron Works.

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Production AND Engineering NEWS AT A GLANCE

HEAT TREATED ON THE REEL—To simplify work handling and storage, General Cable Corp. processes its light gage aluminum wire through annealing cycles on reels weighing about 200 pounds. Heating the wire uniformly on reels is difficult as the windings on each reel are sufficiently dense to make it necessary to treat each full reel as a solid mass. General Cable does this by means of a closely controlled furnace that includes two individual combustion chambers. Fans in each chamber recirculate the heated gases at high velocity over and around the work. By controlling both zones closely, an accurate heat balance is maintained throughout the heating chamber.

"INTERNATIONAL VISION" FOR ENGINEERS—Three-dimensional scale models cut from a new plastic developed by Westinghouse scientists now enable engineers to get a "portrait in color" of the strains encountered in tools, machine parts and other objects. The new material can be cast in cylindrical or rectangular chunks 8 inches in diameter or width and 36 inches in length. Previous "photo-plastics" were limited to flat pieces and not more than 1¼ inches in thickness. Already the plastic is aiding researchers in gun factories, airplane engine plants, and naval laboratories in the design of new equipment and machinery.

MANPOWER SHORTAGE?— One way to overcome manpower shortage is to make more use of available remote control systems. Shell Oil, for example, found it could operate distant pumps that move oil products through its pipe line running from the Wood River, Ill., refinery to Columbus, O., with such a system. In effect, pipe line dispatchers in the company's New York office have oil at their finger tips—850 miles away. To reach any of the four specially controlled pump stations they merely dial code numbers. Dialing activates equipment at the stations to start or stop pumps or request information on operating conditions. A telemetering system automatically sends reports back to New York. System also enables dispatcher to sound a siren at each station in case of emergency.

HAVING PAYROLL PROBLEMS?—One way to solve that payroll chore—figuring out how to pay workers for both working and waiting time and at piece rates is to make use of electronics. Latest machine built by Potter Instrument Co., heralded as the world's first time study computer does the job in a fast but unspectacular manner. It takes the simplest way out by imitating the work that is to be done, then totaling wages due for it. In exactly 8 minutes the machine completes a full day's work. The computer also can be used to plan work cycles ahead of time so that expensive machines need not stand idle.

"TAGS" METALS MANY WAYS—Many chores can be performed by a rapid nondestructive tester developed by Doschek & Walker Inc., Crafton, Pa. It can sort mixed steels or nonferrous alloys in metalworking plants and stockrooms, or it can be applied in testing finished parts of almost any size or shape without special fixtures. In fact, it sorts almost any electrically conductive material according to its chemical or constitutional nature. Development's widest field of application is in sorting carbon and low-alloy steels, stainless steels and nonferrous alloys. It can be used to determine in a great number of cases the relative degree of heat treatment of finished machine parts, or the structural effect of cold reduction.

PROCESS WORTH CHECKING—If you have reason to believe you may be involved in manufacturing cartridge cases for the government, it may be worth your while to know something about the Manurhin process. This is a French method of producing small arms cartridge cases from extruded brass rod. Chief advantage of the process is the savings it makes in materials. Material loss in forming small cartridge cases from extruded brass rod, for example, is 0.3 per cent as compared to 34 per cent discard in blanking from strip. (p. 88)

AUTOMATION AGAIN — Automatic processing is the by-word in television tube production at the Ottawa, O., plant of Sylvania Electric Products Inc. Here, all phases of manufacturing—machining, handling, sealing and inspection—are geared to high-speed production to meet the demand for TV sets this year. In one automatic operation, the metal cone and glass face plate are sealed together and tempered by passage through a single oven. (p.92)

DOUBLE OUTPUT—Twice the output at half the cost—that is what happened at one company when it resorted to induction heating in silver alloy brazing a variety of hydraulic cylinders. Fixtures employed not only were simple, but very effective. They handle cylinders up to 100 inches in length rotating the work to assure a uniform heat pattern. (p. 95)

FERROSTATIC PRESSURE—Nothing but perfectly-made refractories can hope to repel the vicious attack of molten metal in a blast furnace. If no cracks are present in the hearth, the metal itself begins making openings of its own by subjecting all refractory surfaces it can reach to a pressure of 25 to 90 pounds per square inch. This results first in refractory shrinkage, then tiny openings between the brick joints. The hot highly-fluid metal under pressure then enters these crevices, subjecting the brick to pressure on five or all six faces. Under this ferrostatic pressure virtually all types of refractories suffer some reduction in volume. In time, the shrinkage causes the brick to loosen and float out of the hearth. (p. 100)

Cartridge Cases from R

Material loss in a process for forming small arms cartridge cases from extruded brass rod is 0.6 per cent as compared to 34 per cent discard in blanking from strip. Manurhin of France made hundreds of millions of components by the method prior to World War II

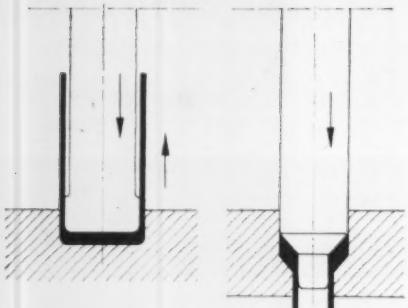


Fig. 1—Difference between forward and backward extrusion. (A) Backward extrusion; starting material is a blank, (B) Forward extrusion; starting material is a cup or blank

A FRENCH process for producing small arms cartridge cases from extruded brass rod bears closer examination by cost-conscious American manufacturers. Advantages of the not-new-but-overlooked method stem principally from enormous savings in materials.

The saving in material is due to the absence of web loss. In blanking from strip 34 per cent is discarded. In the so-called Manurhin process the loss is limited to the fag end of a 6-meter rod, or the equivalent of one cup. In terms of percentage, this is 0.3.

From these data, management can easily figure the related savings arising from the reduced floor

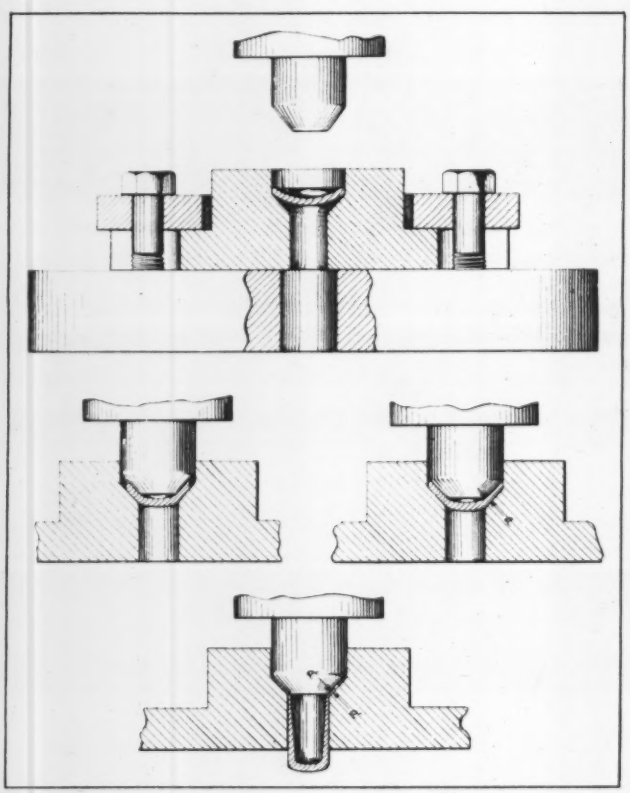
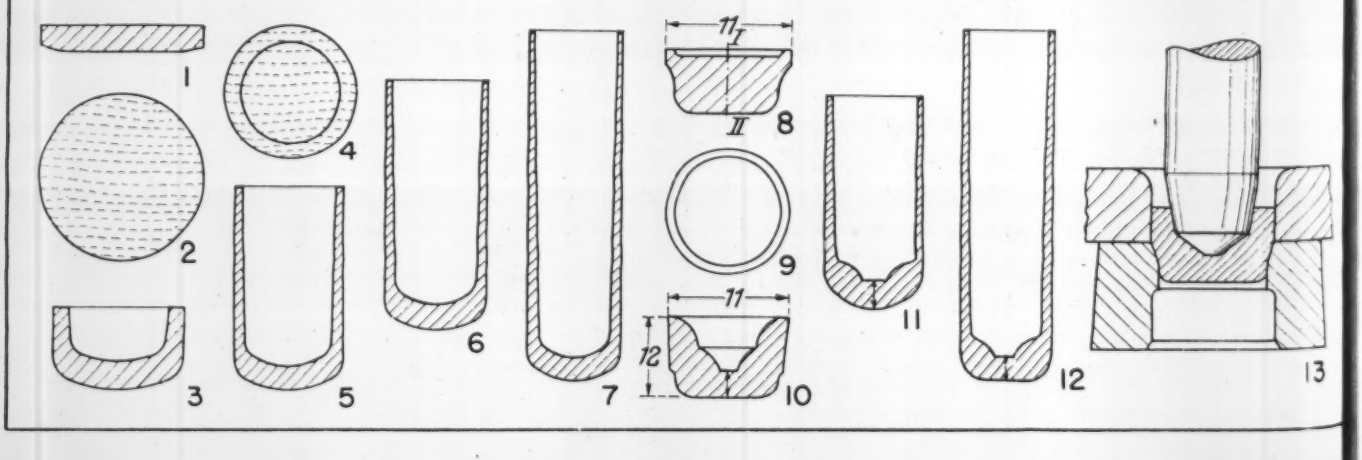


Fig. 2 (left)—The 1922 Maloney patent describes a process of forward extruding a cup from a disk cut from rolled strip. Punch with a conical nose applies pressure to a blank confined in a die having an aperture in the bottom smaller than the blank. Metal is squeezed downward, flowing ahead of the punch

Fig. 3 (below)—Manurhin follows method described in the 1936 Sautier patent. Blanks are first sheared from rod in exact lengths and shaped in a die to form slug shown in patent figure 8. This slug has an upper centering recess and a lower centering collar to insure good concentricity of the pressed cup shown in patent figure 10



Round Stock

By ARTHUR F. MacCONOCHIE
Head of the Department of Mechanical Engineering
University of Virginia
Charlottesville, Va.

space for production equipment and the housing of stock and scrap. Furthermore, since the same size rod is required for all types of small arms cartridge cases, the material held in stock can be considerably reduced compared with strip, since for each type of cartridge, strip of different thickness will be required.

Fewer Defects Probable—In the matter of casting the relatively large ingots employed in contrast to the smaller flat slabs of the strip blanking method, there is the probability of fewer defects. Quality of the metal is likely to be enhanced by the action of the extruding press. Greater ease of holding a round rod to close limits than a flat sheet, whose thickness may vary from edge to edge is also an advantage. And there is little question as to the greater velocity of material flow, as compared with the various rolling, pickling and annealing processes required in the preparation of strip.

Manurhin Used Round Brass Rod—Manurhin (short for Manufacture de Machines du Haut-Rhin) had considerable success with the manufacture of cartridge cases from round stock as early as the years preceding the World War II. The French company also designed and manufactured special machines for the purpose. The entire output of their La Mans factory was based on this method. Hundreds of millions of rounds were made in this way both before and after the plant was taken over by the French Government in 1936.

At the outbreak of World War II, plans were afoot nearly to double the capacity of the cup-making machines. And lest it be presumed that standards inferior to our own had to be met, the specifications for acceptance of ammunition by the army of France are as rigid as any in the world.

Backward, Forward Extrusion—It may be helpful if some explanation is offered of the difference between backward and forward extrusion, in their relation to the various efforts which have been made from time to time to improve the technique of small arms ammunition manufacture and, within comparatively recent times, the carcasses of high explosive shell and other components of ordnance materiel. Referring to Fig. 1(a) a blank is placed at the bottom of a die nest whose interior diameter is somewhat larger than that of the punch. Thus, on the descent of the punch the metal is squirted up around the punch. This action is essentially that of forging a shell from a round billet which fills the die. This is known as backward extrusion.

Forward extrusion, (b) implies a movement of the material of the starting cup or blank ahead of the punch. The punch body functions as a hydraulic plunger, forcing the metal of the cup to flow in compression through the annular space between the pilot of the punch and the shoulder of the extrusion die.

The Maloney Patent—Among the earlier references in patent literature to attempts to initiate the cartridge case manufacturing sequence by extrusion, is the Maloney patent of 1922. This is shown in Fig. 2. By means of a punch with a conical nose, pressure is applied to a blank confined in a die having an aperture in the bottom smaller than the blank. The metal is squeezed downward and flows ahead of the punch in the manner indicated.

This appears to be an advance on the Hooker patent in respect to the employment of a flat blank rather than one with upturned edges. Further, in the Maloney patent, there is an absence of a "forming" portion of the punch. In other words, the internal cavity owes its shape to the action of extrusion alone. This invention contemplates the use of a flat disk, punched from the strip in the familiar manner of time-honored methods.

Severe Tooling Problem—The tooling problem of the Maloney technique is severe, rendering the practicability of this method dubious. Although some drawing operations are avoided by this method, since the starting material is a flat strip, the loss (in manufacturing expense) due to the web, still persists. Extruding of soft metals such as are used for pharmaceutical products is an easy job, Manurhin insists, the extrusion of brass cartridge cases is another matter.

The Sautier Patent—In 1936 the Sautier patent appeared (Mr. Sautier being assignor to Manurhin). Note Fig. 3. By the use of an extruded rod as the base material in this method not only is there a considerable saving in material but the tendency of the cup to split on subsequent drawing is minimized. This arises from the heavy work pressures expended upon the rod during extrusion, the absence of transverse "grain" and the ease with which round stock lends itself to a broaching process in a die to remove all surface defects. Further, the same round stock size may be used for an entire range of cartridge cases having different head thicknesses, by appropriate setting of the punch in the cupping machine.

Referring to patent figures 8 to 13 in Fig. 3, blanks first are sheared from the rod in exact lengths and shaped in a die to form the slug shown in patent figure 8. This slug has an upper centering recess and a lower centering collar to insure good concentricity of the pressed cup shown in patent figure 10. In this last operation the bottom thickness of the cup is first determined; and this becomes the head thickness of the cartridge case. Starting with the same round stock, different cartridge case, designs may readily be produced by alteration of the machines

"Small arms" include not only hand and shoulder weapons of the individual soldier, but also machine guns and automatic weapons of all sizes up to and including 0.50 caliber. Large caliber weapons are classified as "cannon." Scope of the Manurhin process extends well beyond the strictly small arms cartridge cases.

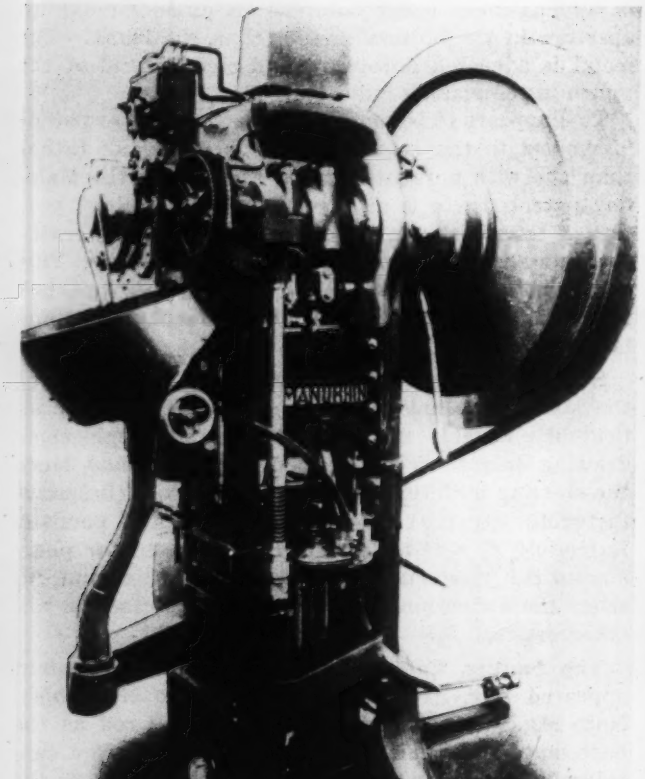


Fig. 4 (above)—Manurhin horizontal press (PKE machine) shears blanks from round stock and squeezes them into slugs. Daily (8-hours) output per machine is about 40,000

Fig. 5 (left, center) — Manurhin vertical press (PKZ machine) takes slugs and makes cups. This machine will produce about 30,000 cups in 8 hours

Fig. 5 (a) (left, below)—A, Slug produced by the PKE machine and first operation of the PKZ machine; B, first punch; C, drawing die

Fig. 6 (right, above)—Test shapes made by the Manurhin sequence, from round stock to final draw. Note the even lip; and compare this result with those shown in Fig. 7. (A) Section of brass bar, (B) and (C) cross section and longitudinal section respectively, of block sheared from bar, (D) shaped block, (E) first stage, (F) last stage, (G) first drawing stage

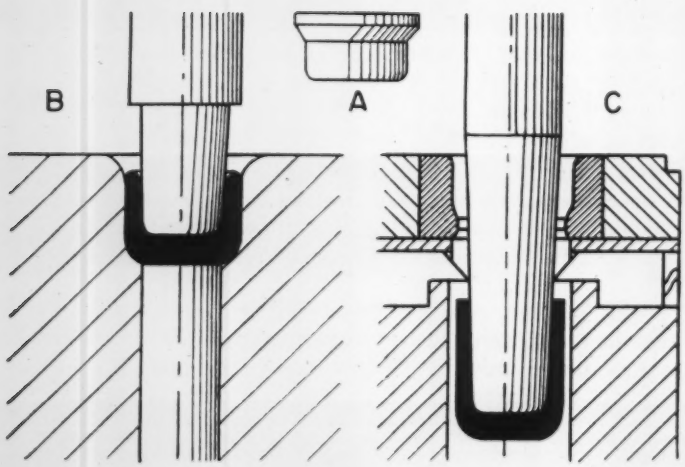
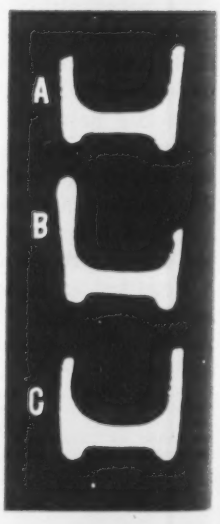


Fig. 7 (right)—Cups produced by two other European methods, according to (A) German patent 250,441 and (B) French patent 237,888. (C) The same pressed with ejector



setting. Complications attendant upon the use of strip which must be rolled to a new gage for each type of cartridge case are avoided.

The single claim of the Sautier patent reads: "Method of making cartridge cases and the like which comprises shearing a blank laterally from a round bar, pressing said blank in a die without being heated to form a solid block presenting an upper cylindrical collar and a lower rounded shoulder, this block being then pressed in a second operating stage and also without being heated into the form of a cup having a more elongated form than the pressed block and the same upper diameter as the pressed block."

Slug-Making Machine—Fig. 4 shows the machine* built by Manurhin to cut the blanks from the rod and form slugs. Round stock is fed through the rollers and carried, by intermittent motion, through a die against a stop.

A shear, moving transversely, slices the stock. The sheared blank is then carried to a die by means of a lever, where it is formed into a slug and automatically ejected. Output of slugs, each within very close weight limits, is around 100 per minute.

Cupping and Drawing Machine—After annealing, the slugs produced by the horizontal press are fed to the double operation vertical press* shown in Fig. 5. Here the slugs are first of all cupped (with some minor modern modifications of form) according to patent figure 10 of Fig. 3; then drawn according to patent figure 11. Head thickness is rectified in the first of these two operations by appropriate setting of the punch and is not subject to further modification in subsequent drawing operations.

Drawing is done in a die of the form shown in Fig. 5a at C. Slug produced by the PKE machine and the first, or cupping operation of the PKZ machine in which head thickness is finally determined are shown at A. Action of the machine is wholly automatic. Slugs are merely poured into the container seen on the left, Fig. 5, and reach the first punch shown at B, Fig. 5a. After pressing, the cup is lifted by the extractor and carried by a conveyor plate to the second punch, shown at C, which forces it through the drawing die.

A liquid coolant lubricates and keeps the tools in good condition; a safety clutch prevents damage to the machine in the event of mishap. This PKZ vertical press has a capacity of around 75 draws a minute.

Manurhin Sequence—Manurhin sequence before the above operations consists of first melting down the charge of about 70-30 brass and casting into round ingots 150 mm (5.9 inches) in diameter. Top of each ingot is then cut off and the remainder sawed into billets.

These are now reheated and extruded in hydraulic press into rod about 20 mm (a little over ¾-inch) in diameter. The extruded rod is then drawn cold to 15 mm diameter (0.59 inch). The rod is pulled through a broaching die which removes about 3/10 mm (1.2 hundredths of an inch) from the surface, thus eliminating any surface defect which might later give trouble. The job of making the round stock is completed with a final draw to 14.2 mm (0.56 inch) with a tolerance of plus or minus 8 ten thousandths. The rod is then fed to the slugging machine.

Bete Noire of the Cupping Operation—Studies made of the components produced by the Manurhin process are shown in Fig. 6. Regularity of the lip indicates a high degree of uniformity in wall thickness of the cup. Lest it be assumed that the matter is presented in a favorable light by careful selection of the sample, figures were offered to prove that the old *bete noire* of the cupping operation, using blanks cut from flat strip, namely "thick and thin" was virtually licked.

Below are the results obtained on batches of 8 and 10 components, whose wall thicknesses were measured by a Zeiss adjustable recorder.

First Operation (Pressing the Cup)	Eccentricity in Thousandths Inch Max.	Min.	Av. of Batch
This is shown at B in Fig. 5a These measurements were taken 0.45-inch from the bottom of the cup.	1.34	0.71	1.1
Second Operation (The Draw)			
This is shown at C in Fig. 5a Measurements were made 0.43 inch from bottom of draw.	1.46	0.20	0.75
Second Operation			
As above, but measurements made 0.71 inch from bottom.	1.46	0.40	0.95

These are impressive results. Thick and thin is, in part, inherent in the nature of the process of making a cup from a flat blank. The centering recess on the upper surface of the Manurhin slug, coupled with the effect of the lower guide collar, has a good deal to do with these satisfactory results.

Comparison of Concentricity—To substantiate these impressions, compare the Manurhin cup, Fig. 6, with the cup prepared acccording to the German patent, Fig. 7, and with the cup formed according to the French patent. Note how the lip rises on one side in both cases, giving evidence of irregularity of form. In both instances the initial blank is a flat disk and is subject to backward extrusion.

If a cupping punch is applied to a flat disk, the smallest eccentricity of the initial contact may be emphasized as the action proceeds, giving rise to a thick and thin cup and indeed, in severe cases to a cup in which the punch has run almost completely out of one side. On the other hand, if the punch is centered in the slug by the upper recess and the slug itself is centered by the tapered collar, what else could one get but a highly concentric cup?

A similar problem is encountered in the forging of a steel shell from a billet. No matter how rigidly the punch is guided, an eccentric carcass is apt to result, especially if the billet has not been thoroughly heated through, leaving the center a bit harder than the exterior. In fact, so acute is this problem that a large amount of unnecessary metal must be left on all carcasses to insure that an acceptable percentage will "clean up" in the subsequent machining operation.

(To be concluded)

* Both of these machines are covered by a second patent, 2,029,797, owned by Manurhin.

Automation: Key to Fast TV Tube Production

Automatic machines, conveyors and methods of making quality checks step up Sylvania's television tube processing

AUTOMATION is the by-word in television tube production at the Ottawa, O., plant of Sylvania Electric Products Inc.

It extends to almost all phases of processing—ma-

COMPLETED electron guns for television picture tubes require precise alignment of parts. Nearly 100 stainless steel parts must be positioned carefully and spot welded together. Finished guns shown here are electromagnetic type →

GIANT automatic conveyor system, here, is big help in applying screen material to both metal and glass picture tubes. Bulbs are clamped on conveyor, partly filled with solution in which fluorescent screen material is held in suspension. As they move toward end of belt, screen material settles out on bulb face

HERE operator is placing TV tube on a cart that takes it through new straight-line exhaust machine designed for high-speed production. Cart acts as a pump, and equipment in cart feeds energy to it and the bulb. Carts can be taken out of "line" at will. Control board lights indicate what is happening to each bulb

ELECTRON gun mounts and finished glass tubes are sealed together in this automatic machine. Here, operator is removing an assembled tube

chines employed, methods of handling, inspection techniques—all geared to high-speed production to meet the 2,500,000 to 9,000,000 estimated sale of TV sets in 1950—a rate twice that of all prior years combined.

Important steps in producing these glass and metal viewing tubes, shown in the accompanying views, include precise alignment of parts for proper operation of an electron optical system that produces an electron beam and makes possible sparkling-clear television images on the screen; application of screen material to both metal and glass; sealing the glass face plate to the metal cone, assembly of these components; and providing a double check or better than 100 per cent quality test on each tube that is manufactured.

AFTER tube screens settle on the conveyor the liquid is automatically poured off and bulbs are conveyed to dryer. Foil caps over bulb necks prevent dust contamination. Air conditioning this section assures controlled temperature and humidity conditions →

AUTOMATIC sealing of glass plate to metal cone is handled by high-speed rotary equipment. During the operation, the metal cone and glass face plate are sealed together and tempered by passage through an oven. Operator is removing completed bulb assembly, face of which will be screened and further processed before electron gun is sealed. Two types of automatic sealing machines are employed in the Ottawa plant to speed sealing process

PRACTICALLY all tubes require an outside graphite bearing coating. Infra-red lamps are used to dry this coating as tubes pass around automatic spraying equipment shown here

EVERY tube is checked individually and later at random. Operator here is checking cathode activity and process quality

SEEN AND HEARD IN THE Machinery Field

By GUY HUBBARD
Machine Tool Editor

COMPETITION FOR MEN: One of the signs of the times is the mounting volume of newspaper advertising calling for skilled and semiskilled workers in the metalworking industries. This brings out the fact that our reservoir of trained manpower is scarcely adequate to meet an industrial emergency. At the same time, it emphasizes the need for more of the kind of equipment which will make the most of the limited amount of shop talent that is available.

Pages of "help wanted" advertisements in Cleveland papers—and in those of other machine tool centers—prove that machine tool builders and tool and die shops share this crying need for more skilled workmen. At the same time, much space is being used by central western and west coast aircraft manufacturers in an effort to tap the same reservoirs of manpower from which the machine tool builders and tool and die shops are counting on drawing their added workmen.

During times like these, the machine tool industry has one intangible but nonetheless powerful advantage over its competitors in the race for mechanical talent. That advantage lies in the peculiar loyalty which good craftsmen have toward machine tool companies with which they are associated or with which they once were associated. In the past, this has made it difficult for outside organizations to "raid" the machine tool builders. At the same time this has made it possible for machine tool builders to call back good men who have drifted away or gone into retirement.

In view of the violent "ups-and-downs" which the machine tool industry has experienced over the years —resulting in many "lean years" for everybody from presidents to sweepers—this loyalty is difficult for an outsider to understand. However, as one who grew up in the industry, I can give several reasons for it.

First, machine tool workmen are a lot closer to management than is true in most other industries. Second, machine tool building is nicer work than almost any other machine shop activity. And third, every machine tool craftsman worthy of the name takes personal pride in every machine in the making or tooling of which he has played even a minor part. Loyalty such as this is deserving of respect and material recognition. Industry as a whole could do with more of it.

STRATEGICALLY PLACED METAL: One of the most important attributes of the successful machine tool designer always has been his ability "to put the metal in the right places". This ability has been variously explained as "instinct", as lucky guesswork and as experience gained the hard way—by making mistakes. As a matter of fact, it is a combination of common sense and experience, involving a surprisingly small number of mistakes.

Machine tools have grown heavier and heavier as the years have passed. It is a far cry from the spindly-legged models of 1850 to the full-bodied structures of 1950. Increased weight and increased horsepower bear a rather definite relation to each other. The metal must be there to resist deflection under heavy horsepower and to "soak up" unavoidable vibration. Flyrods and aircraft engines and even church steeples can be designed to flex under load. Machine tools must be designed to resist deflection like a granite wall.

One must look inside a modern machine tool to realize how strategically its metal is distributed and what great skill on the part of patternmakers and foundrymen is involved in carrying out the engineering of beds, frames, headstocks, slides, tables, etc.

Many other types of industrial machines have most of their ribbing and bracing on the outside. This makes for relatively simple patternmaking and foundry practice. Machine tools, on the other hand, present smooth exteriors but have the most elaborate kind of ribbing, bracing, bearing supports, partitions, etc., hidden inside. This is not merely for appearance. It is for operating convenience and safety and for housing of mechanism. Good appearance is a desirable by-product.

Anyone who persists in the belief that American machine tool builders pour more metal into their machines simply to justify higher prices under the obsolete "price-per-pound" formula, mentally is living in the dark ages of machine shop economics. Actually the metal is there to insure maximum production, sustained accuracy, safe operation and long tool and machine life. Generous use of metal where it does the user the most good is and long has been one of the main reasons why American machine tools are the best in the world.

SHOP WORK ISN'T HARD WORK: Prior to his retirement as president of Packard Motor Car Co., I had the privilege of sitting in on several sessions during which George Christopher discussed in detail improvements in shop conditions as he had observed them—and helped to bring them about—over the years.

Here is one point in particular which Mr. Christopher emphasized: "As compared to what it used to be, machine shop work no longer is hard work." He spoke from experience, having worked his way up from the shop. He was able to set up some comparisons between old ways and modern ways which proved his point beyond the shadow of a doubt.

Even those of us who were familar with old-fashioned hops are inclined to forget about the heavy lifting, constant "foot work", poor ventilation, extremes of heat and cold, primitive sanitation, long hours, low pay and social ostracism that so-called "dirty machinists" had to put up with. Things certainly have changed for the better. Too few people today appreciate it.

Induction Heating Doubles Cylinder Soldering Production

Twice the output at half the cost. Those are the results one company is getting using induction heating to silver alloy braze a variety of hydraulic cylinders

By JOHN NELSON
Plant Engineering Department
Commercial Shearing & Stamping Co.
Youngstown

MORE production, lower costs and better products are among advantages the Hydraulic Products Division of Commercial Shearing & Stamping Co. gains by using induction heating to silver alloy braze a variety of hydraulic cylinders. The advantage lies in the scope and variety of application. The method of and reason for application are unique in that they illustrate the surprising versatility and flexibility of induction heating units.

Fig. 1 shows a simplified section of a typical hydraulic cylinder with the points of interest circled and enlarged. Note the heavy weldments. Also note on the plunger cylinder the method of applying braze metal to the piston ring.

The steel piston ring is first welded to the cylinder,

TOP AWARD WINNER

This week, STEEL is happy to present readers the accompanying article based on the author's first prize manuscript in the recent nation-wide "Tocco Economy in Production" contest. For his work, author Nelson was awarded $1000 by Ohio Crankshaft Co., Cleveland.

then moved to the machine shop where the groove is undercut to receive the braze metal: Thence back to the welding department where the braze metal is laboriously laid in by torch and rod. From here the cylinder retraces its steps back to the machine shop for final machining. It is apparent what this sequence of operations can do to your cost, not to mention the

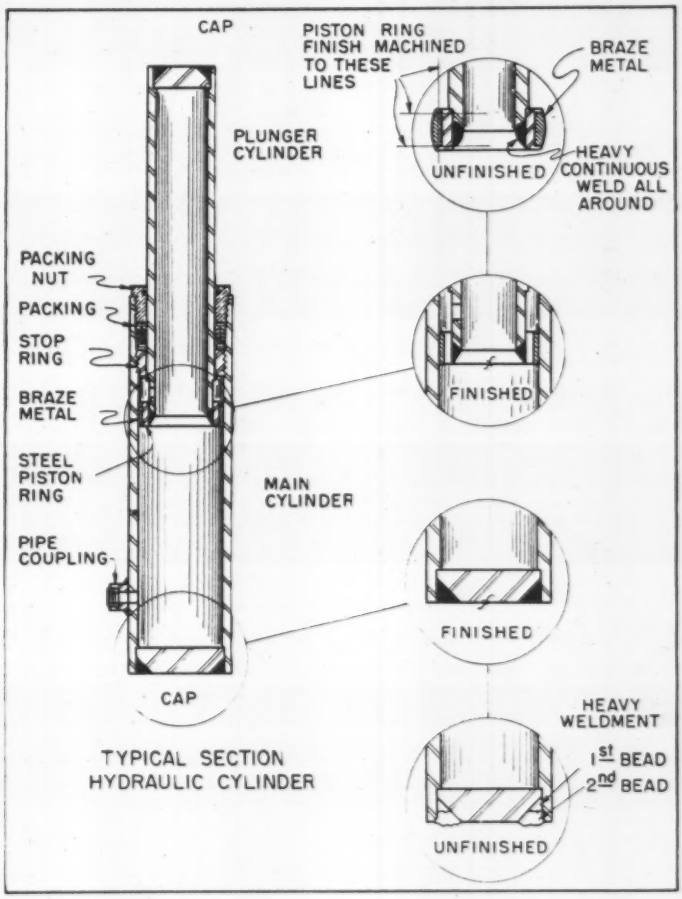


Fig. 1 (top)—Simplified section of typical hydraulic cylinder. Points of interest are circled and enlarged. Cylinder diameters vary from 2 to 12 inches; lengths from 6 to 100 inches

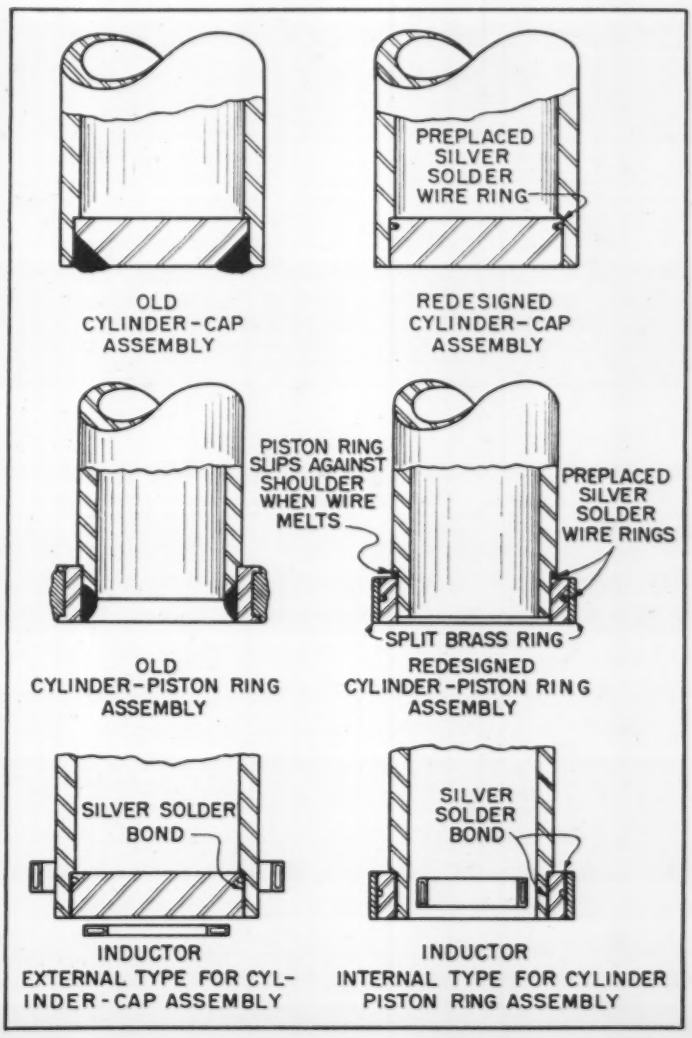

PREPLACED SILVER SOLDER WIRE RING
OLD CYLINDER-CAP ASSEMBLY
REDESIGNED CYLINDER-CAP ASSEMBLY
PISTON RING SLIPS AGAINST SHOULDER WHEN WIRE MELTS
PREPLACED SILVER SOLDER WIRE RINGS
SPLIT BRASS RING
OLD CYLINDER-PISTON RING ASSEMBLY
REDESIGNED CYLINDER-PISTON RING ASSEMBLY
SILVER SOLDER BOND
SILVER SOLDER BOND
INDUCTOR EXTERNAL TYPE FOR CYLINDER-CAP ASSEMBLY
INDUCTOR INTERNAL TYPE FOR CYLINDER PISTON RING ASSEMBLY

Fig. 2 (bottom)—Assembly redesigned for induction brazing. Two types of inductors were required, one internal type for brazing piston rings and one external type for brazing cap to the cylinder

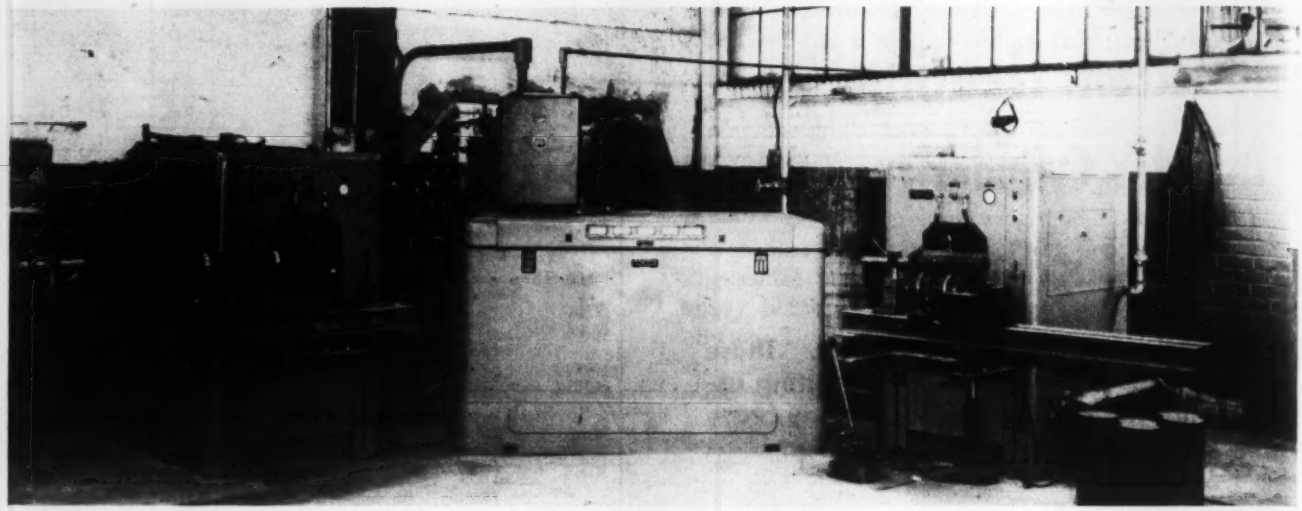


Fig. 3 (above)—Equipment for the job includes one 50 kw single station flattop induction heating machine, one 100 hp 440/3/60 reduced voltage manual starter, two standard remote stations complete with water-cooled variable-ratio tapped transformers and one voltage regulator

needless waste of material which has no scrap value because of the mixture of brass and steel.

Silver Soldering Adopted—The quest for a solution to these and related problems led ultimately to silver alloy brazing, sometimes called "silver soldering." This method of joining metals when properly done results in a joint usually stronger than the parent metals. Its application is not confined to joining ferrous metals, but nonferrous as well and herein lies one of its big advantages.

Initial attempts at silver alloy brazing were made by hand torch heating, but were soon discarded because of the massiveness of some of the jobs and the consequent difficulty of uniform heating. Also, there was the problem of control.

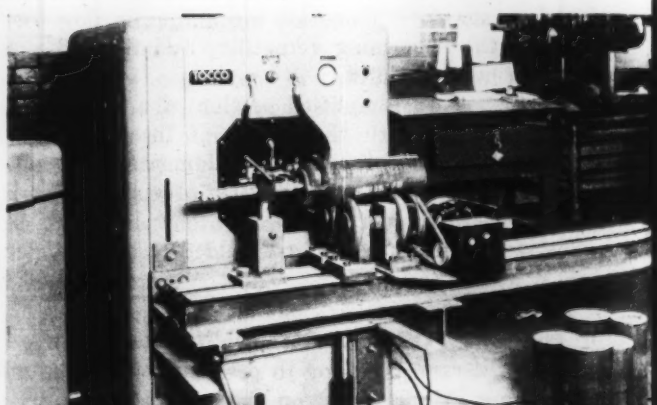
The work was highly skilled and few men were capable of doing the job. Inspection became a headache, and a 100 per cent test almost a necessity. Automatic torch heating equipment, though an improvement, would have led to expenditures unwarranted by the advantages, if any, gained over welding.

The silver alloy companies, in their literature, contain references to operations performed by induction heating units. However, most all of these operations have three points in common, none of which applies fully to our operations. First, nearly all the examples are small, light, easy to handle parts to be joined together or to larger parts. Second, the work-holding fixtures and inductors are of a very special nature, designed specifically for a given joint. Third, the very design of these fixtures and inductors is indicative of very large quantity production runs.

Size Variation a Problem — By way of contrast, our product due to its size variations can range from a comfortable size and weight to a very large and unwieldy size and weight. Elaborate work-holding fixtures and inductors designed for a specific joint are out of the question because of the variety of types and sizes and because the quantities involved in any given type and size are generally not of a nature to warrant these specialized fixtures and inductors.

Experiments performed by Tocco laboratories in Cleveland on some sample assemblies redesigned as shown by the print marked Fig. 2, proved that joint could be made quickly and efficiently. Fig. 2 reveals

Fig. 4 (below)—Horizontal work-holding fixture rotates cylinder during heating cycle



that two types of inductors were required, one internal type for brazing the piston rings and one external type for brazing the cap to the cylinder. Cylinder length posed no problem since all the joints are at or near the end of the cylinder. The problem then was to accommodate the various diameters.

Four Inductors Designed—With this in mind Tocco undertook to design and fabricate a group of four inductors of each type to service a diameter range of 6 inches, using any one inductor for one or more diameters, thereby sacrificing a small efficiency loss to a gain in flexibility. With this group of inductors as a nucleus, others are now being fabricated to widen the diameter range.

The equipment installed to do the job in addition

to the above inductors consists of: One No. 3MG503-3 standard 50 kw single station flattop induction heating machine, one 100 hp 440/3/60 reduced voltage manual starter, two 2RS3-1 standard remote stations complete with No. 55 water cooled variable-ratio tapped transformers and a voltage regulator, Fig. 3.

Fixture Is Simple—It became apparent from the outset that because of the extreme length of some of the cylinders, (up to 100 inches or more) and the design difficulties encountered, a vertically mounted work-holding fixture was impractical. Furthermore, it was desired to rotate the cylinders during the heating cycle to assure a uniform heat pattern. The result of the fixture is seen in Fig. 4. It is simple, yet extremely effective.

The fixture is fastened to the remote heating station by means of bolts through the slots of the fixture support bar provided on the unit. To assure alignment the fixture support bar nearest the center of the fixture is gibbed with the fastening bar of the fixture. By merely loosening the three bolts on each fixture support bar, the fixture can easily be moved up or down hydraulically. At the present time, a hand pump and hydraulic ram are used for this purpose.

Rolls on Centerline—The inductors are all so designed as to maintain a constant distance of 12 inches from the face of the output panel to the centerline of the workpiece. Thus the rolls holding the workpiece must also be on this centerline. These rolls are held to the H-beam ways by a bolt just large enough to fit through the machined space between the H-beams. The rolls are then adjustable along the ways to accommodate the various lengths of cylinders.

Of the four rolls pictured, one is driven by a small ⅛-hp, 1725 rpm electric motor with a speed reducer and pulley V-belt combination reducing the roll speed to 25 rpm. The other three rolls are idlers. By turning the two sets of rolls at a slight angle, the cylinder will feed in the desired direction, in this case into the inductor.

Stop Adjustable in Both Directions—To prevent contact with the inductor and assure correct spacing from the end of the inductor, the cylinder is fed against the stop protruding through the end coil the desired distance. This stop is a spot welding electrode and holder unit and can be water-cooled if necessary. Mounted on the H-beam ways, it is adjustable both vertically and horizontally and is used when joining end caps and cylinders.

TABLE I

Operation	Set Up	Inside Diameter of Cylinder 3¼"	5¼"	8½"
Old Method				
1. Weld cap	12 min.	9.8 min.	15.3 min.	24.8 min.
2. Face cap after welding	48 min.	5.0 min.	6.1 min.	9.8 min.
	60 min.	14.8 min.	21.4 min.	34.6 min.
New Method				
1. Wash cap and cylinder	12 min.	1.0 min.	2.0 min.	3.5 min.
2. Assemble and braze cap and cylinder	24 min.	2.7 min.	3.5 min.	5.0 min.
	36 min.	3.7 min.	5.5 min.	8.5 min.

The other work-holding fixture for joining cylinders and piston rings is a duplicate of the first one except for the work piece stop. This consists of a ball bearing mounted on a bracket, adjustable vertically and horizontally so that the point of contact is on the outer face of the cylinder. With the rolls again placed at a slight angle, the cylinder feeds against this bearing and maintains the correct position with respect to the inductor.

Setups Easy—Since the power settings and proper capacitance rating, once determined are fixed for any given diameter job, a setup consists merely of installing the inductor, raising or lowering the fixture to the right level and adjusting the stops for correct spacing.

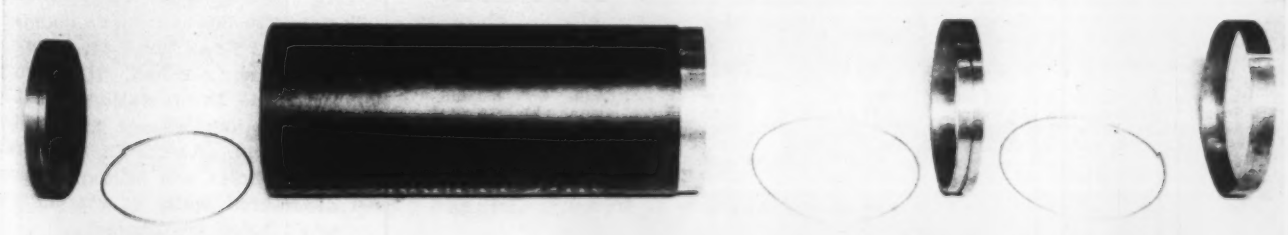
Fig. 2 shows how the old welded joints and the brazed piston rings have been redesigned for silver alloy brazing. In the cylinder-cap assembly, the cylinder is counterbored as before but the new cap has a machined groove to receive a preformed silver alloy wire ring. The cylinder-piston ring assembly consists of the cylinder with a turned shoulder as before, a steel piston ring with a machined groove for a preformed silver alloy wire ring and a die formed split brass ring. These same redesigned assemblies are shown in Fig. 5.

Old and New Methods Compared—From the standpoint of economy, let us compare the old method with the new method of silver alloy brazing on three typical diameters of cylinder-cap assemblies. For convenience and in order to avoid the confusion of using both money and time, in our comparison all money items have been converted to minutes on the basis of the per minute cost to the company of the average worker's time. (See Table I.)

Before an operational comparison is possible, difference in the cost of component parts of the two assemblies has to be found. To do that, the difference in cost of the component parts will be expressed in terms of minutes as explained above.

Thus with the 3¼-inch size first, counterboring

Fig. 5—Redesigned cylinder-piston ring assembly consists of the cylinder with a turned shoulder, a steel piston ring with a machined groove for a preformed silver alloy wire ring and a die-formed split brass ring



the cylinder costs the same with either method, material remaining constant; machining the cap costs 1.0 minutes more by the new method, material remaining constant; the silver solder wire costs 2.5 minutes more than the welding rod or all totaled the new method requires 3.5 minutes more as a component parts differential.

Following the same procedure for the other sizes, the component parts differential for the 5¼ and 8½-inch sizes are 5.3 minutes and 8.3 minutes respectively.

TABLE II

	Inside Diameter of Cylinder 3¼"	5¼"	8½"
Old Method Total	14.8 min.	21.4 min.	34.6 min.
New Method Total	3.7 min.	5.5 min.	8.5 min.
Component Parts Differential	3.5 min.	5.3 min.	8.3 min.
Total	7.2 min.	10.8 min.	16.8 min.

Production Doubled—Now making the comparison, with silver alloy brazing, production is apparently double and costs are approximately half of the old method of welding. Actually the production has more nearly tripled because some of the component parts differential is purchased material cost converted to time for convenience. The cost picture is also more favorable than presented because the new method allows the use of less skilled labor thereby reducing the hourly direct labor cost in the ratio of 6/7.

For the next comparison, take a combination of a cylinder-cap assembly and a cylinder-piston ring assembly such as exists in the typical plunger cylinder. Here again three typical diameters are compared by the two methods leaving out those operations and times common to both methods. (See Tables III and IV.)

Since component parts must again be considered, we have already found the component parts differential for the cylinder-cap assembly to be 3.5 minutes, 5.3 minutes and 8.3 minutes respectively on the three sizes.

Machining Remains Constant—On the cylinder-piston ring assembly, 3¼-inch size first, turning a shoulder on the cylinder costs the same by either method, material remaining constant; machining the steel piston costs the same by either method, material varying slightly but not enough to consider in this comparison; the brass ring costs 1.6 minutes more than the brazing rod; the silver solder wire (2 rings) costs 3.1 minutes more than the welding rod or all totaled the new method requires 4.7 minutes plus 3.5 (from the cylinder-cap assembly), or 8.2 minutes as a component parts differential.

Again following the same procedure for the other two sizes, the component parts differentials become 12.1 minutes and 18.6 minutes respectively for the 5¼ and 8½-inch size.

TABLE V

	Inside Diameter of Cylinder 3¼"	5¼"	8½"
Old Method Total	48.0 min.	60.5 min.	85.0 min.
New Method Total	16.1 min.	19.9 min.	26.1 min.
Component Parts Differential	8.2 min.	12.1 min.	18.6 min.
Total	24.3 min.	32.0 min.	44.7 min.

Less Setup Time Needed—Not to be overlooked are the setup costs of preceding examples which reveal that less time is required to set up for a sequence of operations by the new method than was formerly required by the old method. This is of particular importance where small quantity runs are frequent. It demonstrates that the use of induction heating equipment need not be confined to large quantity production runs.

It may seem like an oversight to neglect power costs in our cost comparisons. Actually, no attempt has been made as yet to measure the power differential between the short cycle operating time of the induction unit and the relatively long cycle operating time of a welding machine. Whatever the difference, it cannot appreciably affect the cost comparison just presented.

TABLE III

Operation	Set Up	Inside Diameter of Cylinder 3¼"	5¼"	8½"
Old Method				
1. Weld cap and piston ring	12 min.	17.1 min.	23.0 min.	34.3 min.
2. Face cap and center	48 min.	7.2 min.	8.4 min.	10.5 min.
3. Undercut piston ring for braze metal	48 min.	6.2 min.	6.6 min.	8.2 min.
4. Braze piston ring	30 min.	9.5 min.	14.1 min.	23.0 min.
5. Finish machine brazed piston ring & center	60 min.	8.0 min.	8.4 min.	9.0 min.
	198 min.	48.0 min.	60.5 min.	85.0 min.

TABLE IV

Operation	Set Up	Inside Diameter of Cylinder 3¼"	5¼"	8½"
New Method				
1. Wash cylinder, piston rings and cap	12 min.	1.5 min.	2.5 min.	3.5 min.
2. Assemble and braze cap and cylinder	24 min.	2.5 min.	3.4 min.	5.5 min.
3. Assemble and braze steel piston ring, brass piston ring and cylinder	24 min.	5.0 min.	6.4 min.	9.0 min.
4. Center cap	48 min.	3.1 min.	3.1 min.	3.1 min.
5. Turn piston O.D. and center	60 min.	4.0 min.	4.5 min.	5.0 min.
	168 min.	16.1 min.	19.9 min.	26.1 min.

Sides, Roof Form Building Frame

Built of sheet metal with straight sides and gable-type roof, but without support members and trusses is a building utilizing a new principle of construction. Rigidity and strength is obtained from panels of deep formed or corrugated sheet metal, extended by means of bolted connection from the floor on one side, up and over the eave, over the ridge of the roof, down the opposite eave and to the floor on the other side.

Developed by Behlen Mfg. Co., Columbus, Nebr., the new Honeycomb building may be built in practically any size desired, it is reported. The first building of this type constructed is 50 feet wide and 200 feet long. Walls are 12 feet, 6 inches high and the distance from floor to roof ridge is about 20 feet.

Sheet metal used is about 1/16 of an inch thick or 16 gage. Corrugation reduces the width of the steel panel from 48 to 41 inches. Two inches are used for overlap of the joints, which may be bolted, welded or riveted. Joints are sealed with synthetic rubber. According to the manufacturer, buildings may be adapted for stock rooms, warehouses, garages and other uses.

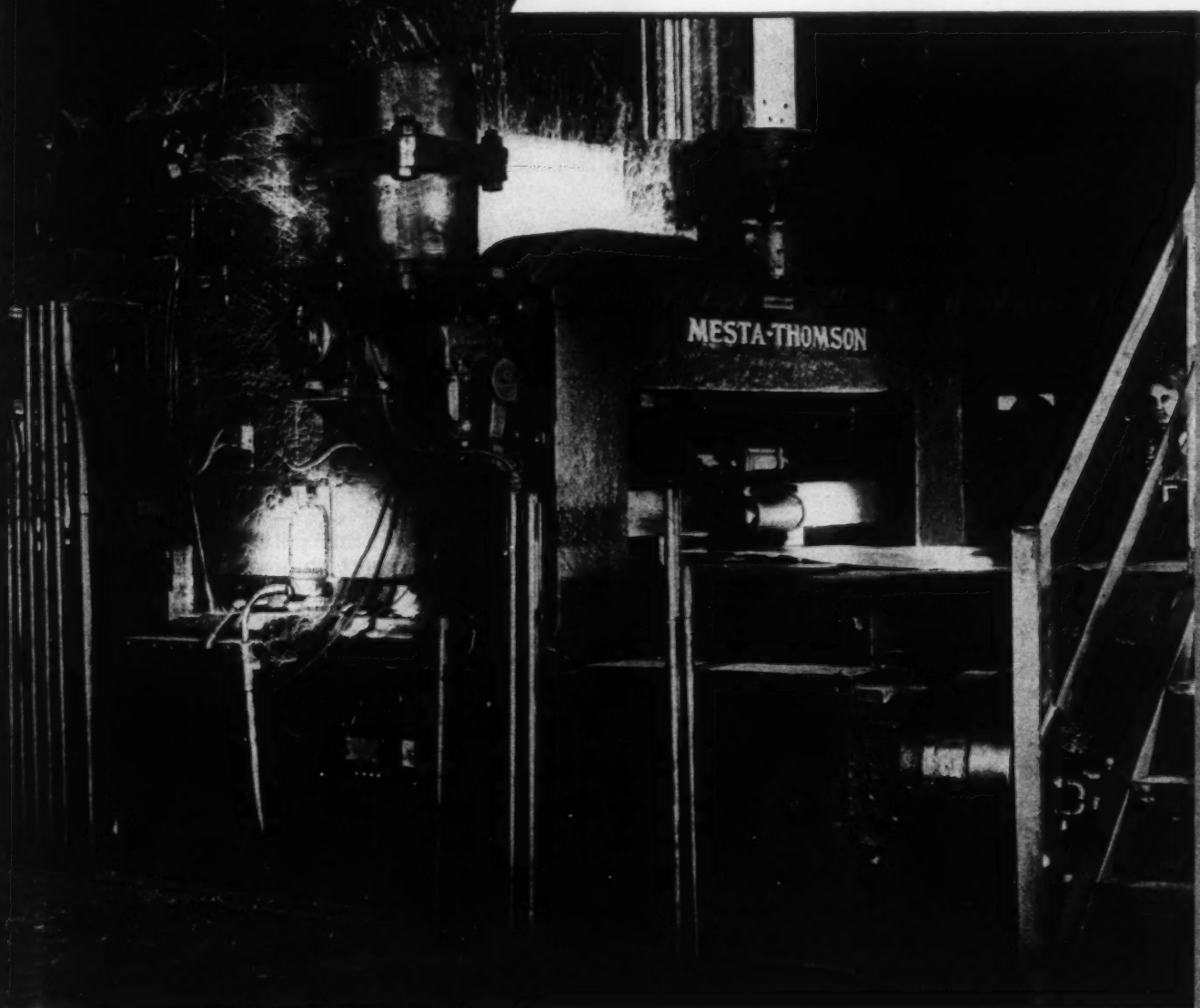
51 Holes in One

Virtually a one man factory, a six-station, center column, automatic cycle machine drills, chamfers, reams, counterbores or taps a total of 51 holes. Built by Snyder Tool & Engineering Co. of Detroit, machine has a capacity of 114 parts per hour at 100 per cent efficiency. Work cycle is 31½ seconds.

After being loaded at the first station, it is automatically indexed throughout the work cycle. Indexing mechanism is driven by a hydraulic fluid motor which permits variable acceleration and deceleration rate. At the second station a 4-inch hole is rough counterbored and ten small holes are bored vertically and horizontally.

The 4-inch hole is finish counterbored and 11 small holes are reamed, chamfered and drilled at various angles at the third station. At the fourth, nine small holes are drilled or spot drilled. At the fifth station, nine small holes are drilled, reamed and chamfered while at station six, ten small holes are tapped.

Increase Cold Mill Production with . . . MESTA-THOMSON FLASH WELDERS



Mesta-Thomson Flash Welder installed in a Mesta High-Speed Continuous Pickling Line

MESTA MACHINE COMPANY

PITTSBURGH, PA.

Designers and Builders of Complete Steel Plants

How To Choose Blast Furnace Refractories

Breakdown of refractories under operating conditions is traceable to various factors. High-duty fireclay brick widely used in blast furnace linings. Sillimanite pads recommended in hearth construction

PART II

By R. P. HEUER
Vice President
and
C. E. GRIGSBY
Service Research Engineer
General Refractories Co.
Philadelphia

SERVICE conditions on refractories vary greatly in different sections of a given blast furnace and in corresponding sections of different furnaces. Hearth refractories, Fig. 5, are subjected to extremely destructive physical and chemical forces. Physically, a hearth must resist the erosive and penetrating action of a devil's caldron of boiling, white-hot, molten iron, searching relentlessly for some tiny opening in the hearth through which to escape its imprisonment. Nothing but perfectly-made brick of highest quality can hope to repel the vicious attack of this tireless prisoner in its never-ending attempt to make a break.

Molten metal, while searching for cracks in the hearth, begins making openings of its own by subjecting all surfaces it can reach to a pressure of 25 to 90 pounds per square inch. This pressure leads to shrinkage of all fireclay refractories, resulting at first in a tiny opening of the joints between brick. The white-hot, highly-fluid iron, under pressure, then enters these crevices, subjecting the brick to pressure on five or all six faces. This ferrostatic pressure, applied over long periods, constitutes extremely slow, but effective, hot molding of the brick. Under these conditions, virtually all types of refractories suffer some reduction in volume. Even the best fireclay brick may eventually shrink considerably in both horizontal and vertical directions, gradually widening joints and permitting deeper penetration of iron. In time, this shrinkage may loosen the brick and let it float out of the hearth. The iron then replaces it, and the process continues, gradually increasing the size of the salamander.

Fig. 5—Masons laying up the hearth of a blast furnace with fireclay bottom blocks

Silica Is Reduced—Hearth blocks are also subject to reduction of silica, which leads to gradual replacement of refractory by metal. They must also resist corrosion by slag containing lime, magnesia, and ferrous oxide. Studies of hearths built of high-duty fireclay refractories have shown that, after service, the zone a few inches from the salamander comprises corundum (Al_2O_3) and anorthite ($CaO.Al_2O_3.2SiO_2$). The major portion of the hearth is composed largely of mullite, with a small amount of glass. This shows one major reason for the superior service of sillimanite (largely mullite) refractories in hearth service.

Refractories used in hearth walls and bosh are subject to heavy loads and the softening action of searing, gaseous flames at temperatures which may reach 3100° F. They must also withstand attack by blast furnace slag high in lime. Bosh brick have also been known to absorb 10 to 20 per cent of alkalies, volatilized from the furnace burden, and alumina-silica refractories give satisfactory service only when cooled by water flowing through hollow bronze or copper castings inserted in the wall. These cooler plates, which extend entirely through the brickwork in many modern furnaces, bring certain regions within the walls to 930° F—the optimum temperature for carbon disintegration.

Destructive Forces Three-Fold—In the lower half to two-thirds of the stack, the main destructive forces are carbon disintegration, slag, and alkali attack. The temperature in the region near the mantle may be only about 2500 to 2700° F, but the brick must also withstand the combined effects of carbon disintegration and alkali attack. The alkalies flux the less refractory constituents of the

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Modern McKee-designed Sintering Plant shown under Construction

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We are primarily engineers and contractors—not equipment manufacturers. But, if we can design a specialized piece of equipment that will do a specific job better than any available, we design and produce it.

Over a period of years McKee has greatly improved the general arrangement and designs of plants for the agglomeration of iron ores, flue dust and other blast furnace raw materials. We have also developed specialized equipment to meet certain definite needs of such agglomeration plants. This equipment includes an improved type of Sintering Machine and numerous items of auxiliary equipment for sintering plants such as Pug Mills, Swinging Spouts, Aerating Feed Hoppers, Ignition Furnaces and Rotary Air Coolers.

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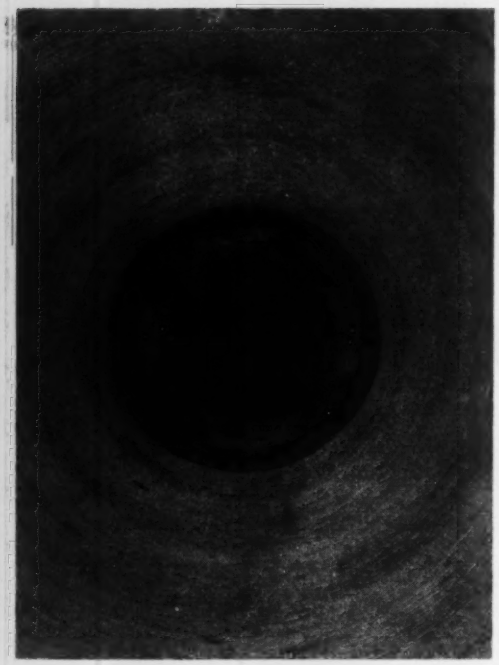


Fig. 6 — Looking upward in a newly lined 1200-ton blast furnace. Bull's eye is the big charging bell

brick, eventually dissolving them almost completely by preferential chemical reaction with them, as compared to the more refractory constituents. When the descending charge breaks off pieces of scab from the walls, relatively large pieces of brick may be removed with it. As a result of the combined action of all these destructive forces, the refractories in this section often wear away faster than in any other location, despite the cooling plates used above the mantle in many American furnaces.

The temperature in the upper half to one-third of the stack is usually not very high, and the chief causes of destruction are carbon disintegration and physical abrasion from the charge. When nephelite ($Na_2O.Al_2O_3.2SiO_2$) forms, as it does in some American furnaces, it may cause expansion which will produce some weakening or peeling of the brick, thus adding to the destruction caused by abrasion and carbon disintegration.

Refractories used in blast furnaces are of two general types, (1) alumina-silica and (2) carbon.

Alumina-Silica Refractories—These are composed almost entirely of alumina and silica with minor amounts of other oxides. The alumina content ranges from less than 15 to more than 99 per cent, with silica the only other major constituent. The current reassessment of carbon hearths in this country has revived the interest of most blast furnace operators in improved refractories of this type. Comprehensive service trials are now being made, largely on refractories that have been fired to higher temperatures or those of higher alumina content, or both.

Regular high-duty fireclay brick have been used for more than 70 years to line most blast furnaces in the U. S. One of the best-known brick of this type is made from a special Kentucky fire clay, Fig. 6, by methods which produce unusually low porosity, and high strength and superior resistance to carbon disintegration. This brick, which holds the world's record for performance previously referred to, has become something of a standard of quality for blast furnace brick, because of its numerous outstanding records for performance in service.

Hi-Fired Brick Last Longer—Hi-fired high duty fireclay brick are specially fired to a very high temperature (cone 18—2714° F minimum). They cost about 50 per cent more than regular brick but are denser, harder, and stronger than regular high-duty fireclay blast furnace brick. These properties give them higher resistance to destruction from all forces found in blast furnaces—chiefly slag, load, abrasion, and carbon disintegration. They are used in any section of the furnace or for the entire lining. Their increased resistance to load and slags is their prime advantage for hearth service.

In the upper part of the stack, their increased resistance to abrasion and their excellent resistance to carbon disintegration are their greatest advantages. Their chief assets in service near the mantle are high resistance to carbon disintegration and alkali attack. Operators of furnaces which have had stack hot spots at the shell, have found that cone 18 high-duty brick have virtually eliminated such trouble. Life of linings has been increased, and the new brick found decidedly more economical.

While only a few furnaces have completed campaigns on these brick most operators believe the life of this type refractory will justify its 50 per cent premium. They are replacing regular blast furnace brick, either partially or completely, in many furnaces because it is believed they will be instrumental in further lowering the total cost per ton of iron.

Hi-fired super duty fireclay brick (fired to cone 18 or higher) are at least equal to the hi-fired (cone 18) high-duty brick in resistance to carbon disintegration. They are somewhat better in refractoriness, density, volume stability, and resistance to abrasion, slag and alkali attack. They have been used as complete linings, as linings above the mantle, and in the hearth below carbon blocks; further trials are being made. Such brick are higher priced than regular or hi-fired high-duty blast furnace brick. Economics will eventually dictate the relative merits of the three types.

High Alumina Refractories—High alumina refractories (varying from 50 to over 99 per alumina), as a class, have enjoyed wide popularity for tough service in many furnaces, despite their higher cost. Materials commonly used in their manufacture are disapore, bauxite, kyanite, fused alumina and synthetic mullite. These materials produce refractories which are materially superior to the best fireclay products in resistance to slag and high temperatures. The common diaspore-fireclay type, of 50, 60, 70 and 80 per cent grades, is often characterized by high porosity and in some cases by shrinkage in service. The 60 to 65 per cent alumina type called sillimanite (composed largely of mullite), is noted for its superior resistance to slags high in lime and alkalies and its marked volume stability and resistance to vitrification and spalling. These properties often make them economical for extra severe service, despite their relatively high first cost.

Pads Improve Hearth Life—In the past 12 years, attention has been focused on the trouble-free operation of furnaces having hearths containing sillimanite monolithic pads. This created a new interest in improved high-alumina refractories of all types, and led to the development of several new grades having improved properties. One of these, a 60 per cent alumina grade made of diaspore and fused alumina, has a porosity of only 16 to 18 per cent, and good volume stability. They will soon be tried in the hearth walls of at least one furnace. Another new brick, containing 55 per cent alumina and having a porosity of 12 to 15 per cent, and excellent volume stability, is being considered by one blast furnace operator for use just above the mantle.

Other high-alumina refractories having properties which make them suitable for blast furnace use will undoubtedly be developed to add to the various types now available. One well-known, but very costly high alumina refractory of extremely low porosity which has been discussed for hearth service is electrocast mullite. No hearth trials have been made, but a current trial around the wearing plates is in progress.

Uses for Sillimanite Brick—Success of sillimanite hearth pads has led to the suggestion that sillimanite brick be used between the upper and

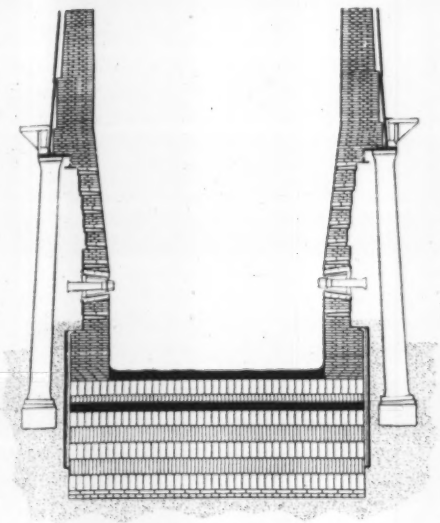


Fig. 7 — Heavy black horizontal lines indicate sillimanite pads (1) at level surface to protect bottom blocks, and (2) in subhearth to retard salamander formation

lower pads to give even greater safety from hearth trouble. These brick are also suggested for a safety course 9 to 13½ inches thick, adjacent to the hearth walls—all the way to the top of the hearth jacket. They should be especially helpful around the iron notch, where carbon has had its greatest difficulties. One major steel company recently installed them in this section in several furnaces. Others are considering their use in the lower stack, near the mantle. The superior resistance of sillimanite brick to carbon disintegration and to slag and alkali attack suggests their probable economy for these troublesome regions.

For all sections of the blast furnace, all alumina-silica refractories—especially bottom blocks—must be true to size and shape, in order to insure very tight, close-fitting construction.

Sillimanite hearth pads constitute a novel and successful method of reducing hearth troubles. They comprise monolithic layers of sillimanite ramming mix installed in several different ways. In one, a sillimanite pad 3 to 9 inches thick is installed atop the hearth. Such a pad bears the brunt of blowing in a furnace and protects the bottom blocks until it is eventually slagged way.

The second, and better, method places a 9 to 18-inch pad below 27 inches of bottom blocks and extending to the shell. In this location the pad burns to an extremely dense, slag-resistant, crack-free layer which stays put, inhibits salamander formation, and gives evidence of a high bottom for a long time after blowing in.

Two Pads Recommended — For the best results, both the upper and lower pads should be used, Fig. 7. The cost of such installations would be about 5 to 15 per cent of the total material cost. Since 1938 pads of this type have been installed in more than 20 hearths. All have had good runs, and most of them are still operating. The furnaces have been notably free of any hearth trouble. The first hearth replaced produced 2,527,237 net tons, leaving a salamander of only 780 tons. Two others have already passed this tonnage, with one now near 3,000,000 tons. All others have already produced from 1,000,000 to 2,000,000 tons. These sillimanite pads remain monolithic, because they contain a volume-stable skeleton of more than four parts of solid mullite to each part of liquid. Thus, the hearth brick are protected while the sillimanite pad is slowly fluxed away by slag. Some operators who were using sillimanite hearth pads prior to trials of carbon have now returned them to the status of standard practice.

Sillimanite Bonding Mortar—This is standard mortar for hearth and bosh brick at many blast furnace plants. It is highly refractory, volume stable, resistant to slag action and to carbon disintegration and these characteristics have led to its use in the entire lining by one large steel plant. Its use insures crack-free joints, giving a tight bosh which eliminates nausea or vomiting of workers from inhaling noxious gases during the blow-in period. The cost of using sillimanite mortar in the hearth and bosh is less than 10 per cent of the lining materials cost. Operators who have used it consider this cost well justified.

(Concluded in next issue)

Alloy Decisions Wear

Wear was dealing a large eastern steel mill a heavy blow. Under existing operating conditions it was impossible to flood the pinion and drive gears for the main drive of a 17-foot continuous billet mill with sufficient lubricant to carry off the heat generated by the transmitted load. Because of this, the material on the active contour of the gear teeth frequently was raised to a dull red heat. And in addition, the gear teeth were subjected to severe abrasive action of mill scale.

With the mill operating 24 hours a day, the gear teeth failed in about three to four months of service, and although these teeth were hardened by carburization and quenching, the nature of the failure was so serious that when it did occur, the section of metal at the root of the teeth was worn away to the point where reversal of the gearing was impossible.

In an effort to combat the problem, engineers of the mill had Stroh Process Steel Co., Pittsburgh, make gear castings with a high grade alloy steel surface and a base metal of plain carbon steel. Said to produce a wear resistant austenitic steel surface, the surface alloy work-hardens in service to a smooth glass-like surface with a low coefficient of friction. Installation of gears made by this process and a change in gear design has brought about a service life increase of between 600 and 800 per cent.

Device Limits Short Current

Combining high current interrupting ability with such extremely fast action that the current is cut off long before it can build up to dangerous levels is a device for the protection of low voltage switchgear, bus ways, circuit breakers, transformers and other electrical installations. Called the Amp-trap and made by Chase-Shawmut Co., Newburyport, Mass., it interrupts the circuit in only 0.0035-seconds and permits maximum short circuit current of 10,120 amp.

Operating principle is said to depend chiefly upon the characteristics of certain composite link elements of which silver is one. These links are embedded in sand. When a short circuit current develops in the circuit, the silver link quickly melts and partially vaporizes, breaking the circuit in a matter of micro-seconds. Tendency of the current to force itself across the arc gap is quickly suppressed by the device, as the cross-section of the arc path itself is very small, the gap is short and the silver vapor, in contrast to the vapors of lead, zinc and copper, is virtually a nonconductor.

Heat of the arc is absorbed by the quartz sand and the arc itself is quenched as it converts the sand into a glass fulgerite. The protective device is made in various models and ratings to match electrical characteristics of old and new power units.

Copper Rods Standard Submitted

Round, hexagonal and octagonal copper and copper-alloy rods are the subject of a proposed simplified practice recommendation announced by Commodity Standards Division, National Bureau of Standards, Washington. Proposed by the Copper and Brass Research Association, it lists preferred outside diameters or distances between parallel surfaces of rods ranging in size from $\frac{1}{8}$ to 4 inches. Recommendation is being submitted for approval or comment.

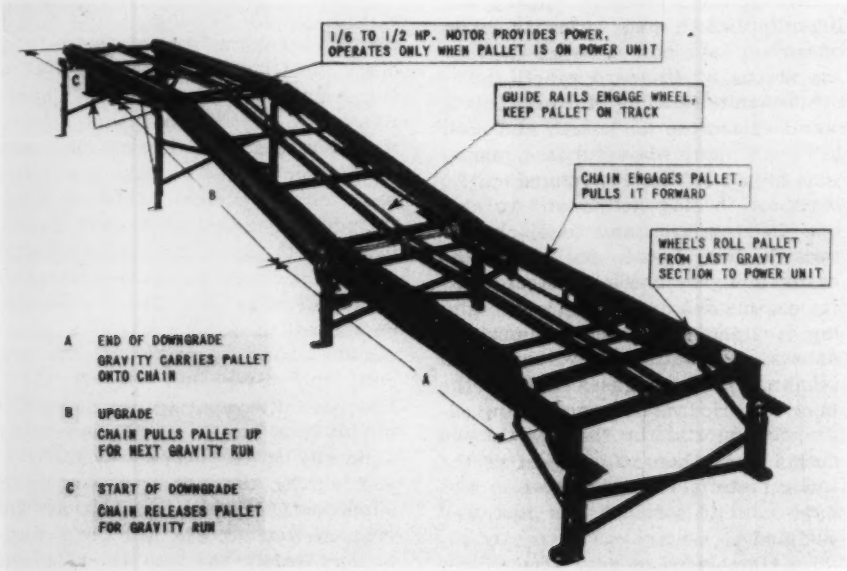
Guided Pallet Conveyor Cuts Processing Costs

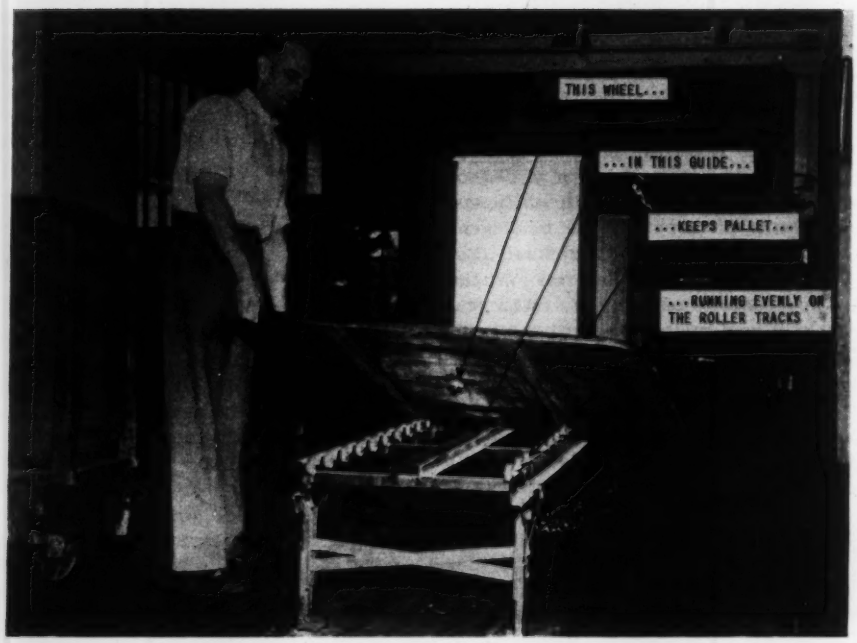
FIRST installation of a new "guided pallet" conveyor system cuts direct labor costs in the finishing department of one company 25 per cent. A 50 per cent reduction in processing time, plus increased production, has resulted since the 700-foot system was put in use one year ago. Production control is simplified, with work-in-process reduced 35 per cent.

The conveyor, developed by Rapids-Standard Co. Inc., Grand Rapids, Mich., was designed principally to expedite assembly, fabrication, processing or finishing operations. Power units and gravity sections bolt together like an erector set, allowing plant workers to install and rearrange the system to fit production needs. Operation of the guided pallet system is illustrated in the accompanying photographs.

Palletized materials remain on the line throughout the production cycle, with flow to each work station regulated by individual worker. Power units index pallets forward and elevate materials to connected gravity sections, combining power with free flow from storage on the line. At work stations palletized goods may be raised, lowered, or rotated.

Work is brought directly to worker for productive use of time formerly spent in lugging goods. Hinged sections in the line permit areas inside the loops of the conveyor to be used for storage or work space.


1/6 TO 1/2 HP. MOTOR PROVIDES POWER, OPERATES ONLY WHEN PALLET IS ON POWER UNIT
GUIDE RAILS ENGAGE WHEEL, KEEP PALLET ON TRACK
CHAIN ENGAGES PALLET, PULLS IT FORWARD
WHEELS ROLL PALLET FROM LAST GRAVITY SECTION TO POWER UNIT
A END OF DOWNGRADE GRAVITY CARRIES PALLET ONTO CHAIN
B UPGRADE CHAIN PULLS PALLET UP FOR NEXT GRAVITY RUN
C START OF DOWNGRADE CHAIN RELEASES PALLET FOR GRAVITY RUN



Tube Serves as Plane Anchor

A 28-inch steel tube, filled with rocket propellant, is being groomed as an anchor for small aircraft and gliders in experiments by Air Materiel Command, Dayton, O. The 1⅜-inch diameter tube, inserted into a holder near the tail assembly of the plane, is driven 18 inches into the ground at 45-degree angle by the rocket propellant, just before the plane touches the ground in landing. Device is operated by a pushbutton in the cockpit.

Attached to the anchor is a 200-foot stainless steel ribbon wound on a hydraulic brake which absorbs the energy at the time of the braking action and permits a smooth stop, it is reported. In ground tests, the anchor reportedly withstood a pull of 25,000 pounds and simulated a 1 to 1½ "g" deceleration of a CG-18 glider.

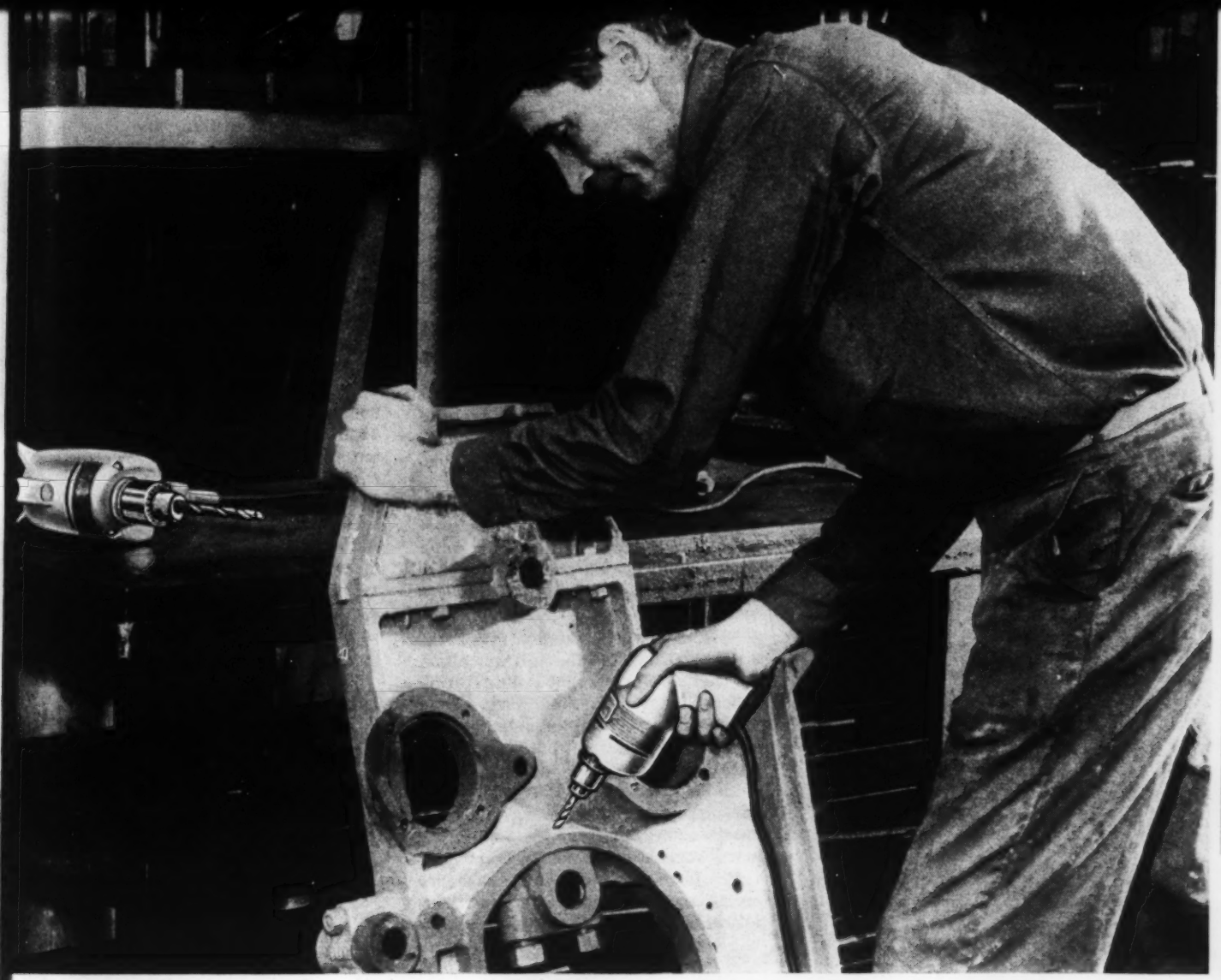
Pump-Generator-Pump

Off-peak pumping from a low-level to a high-level water reservoir and peak period power generation with reverse flow are the twin functions of a newly designed pump turbine unit recently demonstrated by Allis-Chalmers Mfg. Co., Milwaukee, Wis. Elimination of the need for additional pumping equipment is the major advantage of the unit. Pump-turbine is a single runner enclosed in a casing with a stay ring and movable wicket gates.

Rotated in one direction it is a centrifugal pump; reversed, it functions as a hydraulic turbine through which water returns from the storage reservoir to generate power at period of greatest demand. Only the fact that power can be sold at a premium price in peak-load periods justifies the pumped storage procedure, as the higher sale price must offset the cost of moving the water to the higher reservoir and back.

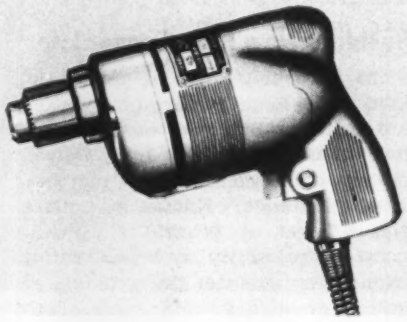
Salvaging by Welding

Information on the repair of gray iron castings by welding, now an established means of economically reclaiming such castings, is contained in a 19-page illustrated booklet published by American Welding Society, New York. Besides describing methods used for automotive repairs, the study should be helpful as a guide in establishing methods of repair for other types of castings. Information is provided on oxyacetylene and shielded metal-arc welding with and without preheat and stress relief, braze-welding, brazing, soft soldering, metallizing and the use of mechanical methods.



Difficult angle drilling on end castings for GASMACO's Automatic Time Cycle Control is made easy with a Model 45 SKIL Drill. (Model 80—½ inch Drill on bench.)

at GASMACO,* difficult angle drilling gets done faster and better with SKIL DRILLS



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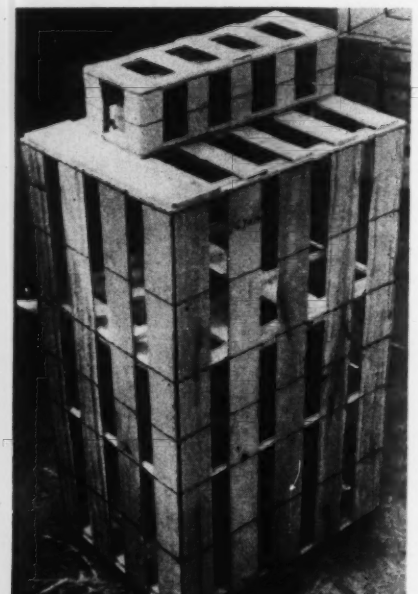
No Tooling for Each Job

Handling a wide range of cross drilling operations, both short and long run, without the necessity of tooling for each job is a Universal fixture developed by Snow Mfg. Co., Bellwood, Ill. Said to simplify tooling, the unit is also said to result in higher production through ease of change-over, set-up, loading and unloading.

Fixture handles drill sizes from No. 54 through ¼-inch, outside diameter of parts from 7/32 through ½-inch and parts of any length. A spring kick-out automatically ejects the part after a drilling operation. The kick-out actuating rod is also used on drilling machines made by the company to allow insertion of the part to contact a micro switch and start the drilling and clamping cycle when the part has been properly positioned.

Band Saw Maker Cuts Shipping Container Weight 50%



TARE weight on shipping containers for big 630-pound band saws made by Crescent Machine Division, Rockwell Mfg. Co., Leetonia, O., was cut from 245 to 120 pounds by changing to wirebound crates. Displacement was reduced so that four more saws can be loaded per car; shipping damage due to container failure was eliminated.

Formerly, the company fabricated its own crates for the tall machines, as well as for its 850-pound tilting arbor saw with a table girth of 14 feet 4 inches. Now the company uses a wirebound crate consisting of a heavy skid base upon which the machine is assembled, a 72-inch wide, one-piece wirebound wrap-around "mat" folded to form the four crate sides, the crate top, and a hood.

The hood covers the upper 6 inches of the saw, eliminating freight penalties and the expense of a protective bag formerly used.

Fig. 1 — 630-pound band saw completely packed, ready for shipment. Wirebound hood covering top of saw saves freight costs by eliminating penalty that formerly had to be paid because machine was not entirely crated. Hood is attached to crate with a few nails.

Fig. 2 — One worker "wraps up" band saw in a wirebound crate. Saw is assembled on base of crate and then moved to this packing line. This picture, taken before hood was adopted, shows paper bag formerly slipped over the top

Thermocouple Easier to Use

Temperature of molten steel is rapidly and easily measured by a lightweight thermocouple which is available in two different styles. Developed by Republic Steel Corp., Cleveland, and built under license by Brown Instruments Division, Minneapolis-Honeywell Regulator Co., Philadelphia, the unit is available with a 90-degree bend for electric furnaces or a 60-degree bend for insertion through open-hearth wickets.

Both styles have 6-foot handles and immersion ends, excepting the immersion tip, are covered with a refractory compound. The complete assembly, handle and immersion end, is about 11 feet long and weighs 40 pounds.

Ups Investment Casting Savings

Method of precision investment casting by the lost wax process, developed by Adapti Co., Cleveland, often makes possible combining of two or more machine pieces into one casting with the result of cutting costs and improving the appearance and engineering features of the product.

It is possible to obtain castings of intricate design and of metals better suited to the product which cannot be readily machined when made by other methods. It is said that very close tolerances can be held, eliminating machining and grinding operations.

Bushings Now Have Longer Life

Oil hardening steel is now being used in the manufacture of all standard drill jig bushings manufactured by Colonial Bushings Inc., Detroit, giving them considerably increased wear resistance. Known as Colonial No. 3 steel, it is said to provide greater uniformity in heat treating, eliminating some of the grinding required previously. Hardness of the bushings is now maintained at 62-64 Rockwell C. The company is still producing special bushings to customers' material specifications.

Lists Brass Mill Products

A pocket-size, loose-leaf data book issued by American Brass Co., Waterbury, Conn., covers brass mill products plus other pertinent information. Sections on products, alloys and compositions, together with com-

plete weight and data tables for major classifications of sheet and strip, wire, rod and tube are included.

Carbon Brushes Standardized

Carbon brushes made by National Carbon Division, Union Carbide & Carbon Corp., New York, are being merchandized at a flat price, packed in standard packages at the same price per brush regardless of quantity purchased. Brushes are put up in lots of 50, 100 and 250, dependent on type of brush. Grades, shunt connections and other specifications for each brush have been studied to provide the most satisfactory general performance, widest latitude of application and lowest price.

Tool Head Triples Production

By simultaneously performing nine roughing operations on a cast aluminum part, Packard Motor Car Co., Detroit, is tripling output per machine per hour on these operations. Only one tool head is used for mounting all of the tools to perform the various operations.

With the new tooling for the Ultramatic converter pump, modified standard Carboloy tools are used in a Gisholt No. 12 high production lathe, rate of metal removal being about 1 pound in 30 seconds. Cutting speeds on the aluminum casting are said to range as high as 3400 surface feet per minute, with spindle speed being 800 rpm. The outside diameter of the pump is 13½ inches.

Operation consists of nine cuts: Three facing, one boring, three combined boring and facing cuts, and two combination facing and chamfering cuts. Total feed is 0.012-inch per revolution. Seven of the nine tools used are standard Carboloy styles, grade 883, slightly modified so as to have a 10 degree front rake and 12 degree side rake.

Only Three Sets—Use of the seven standard style tools reduces tool cost as well as tool inventory requirements. Packard reports that it keeps one complete set of sharpened tools in the tool room and one sharpened set at readiness at the machine, while a third set is in use. Three of the tools are changed after machining around 200 pieces, the change requiring less than 20 minutes, it is reported. The other six tools require sharpening after 2000 pieces.

It is possible to produce 60 units per hour, although the current rate averages 45 pieces per hour. A vacuum operated work holding chuck assists in achieving the high output per hour.

It is said that trouble from built-up edge on the tools, a common experience when machining aluminum, has been eliminated. Contributing factors may be the high cutting speed and the use of a vaporized film of cutting oil directed by air pressure onto the carbide tips through a series of small pipes. Even at the high rate of stock removal, it is said that the work does not heat up. All of the heat is concentrated in the chips, leaving the work and tools cool.

Self-Locking Pins Simplify Design and Assembly

GREATLY simplified industrial design of a wide variety of light and heavy equipment will result from the use of an all-purpose pressed-fit pin, if expectations of the fastener manufacturer, Elastic Stop Nut Corp. of America, Union, N. J., are realized.

Applications for the self-locking and chamfered Rollpin fall into the following five general groups: As fastening pins, pivot or hinge pins, cotter keys, shafts and dowels. The fastener itself is a piece of metal rolled into the shape of a cylinder with a gap of slot which parallels the long axis of the hollow cylinder.

Withstands Vibrations—Slot in the pin permits compression of the cylinder as the pin is driven in, and the resulting tension, caused by the constant pressure exerted by the pin against the walls of the hole is said to secure it in position, even against extreme vibration and shock. Insertion may be in hole drilled to normal production tolerances, but by design smaller than the pin diameter, thus making possible the elimination of hole reaming operations which add to production cost.

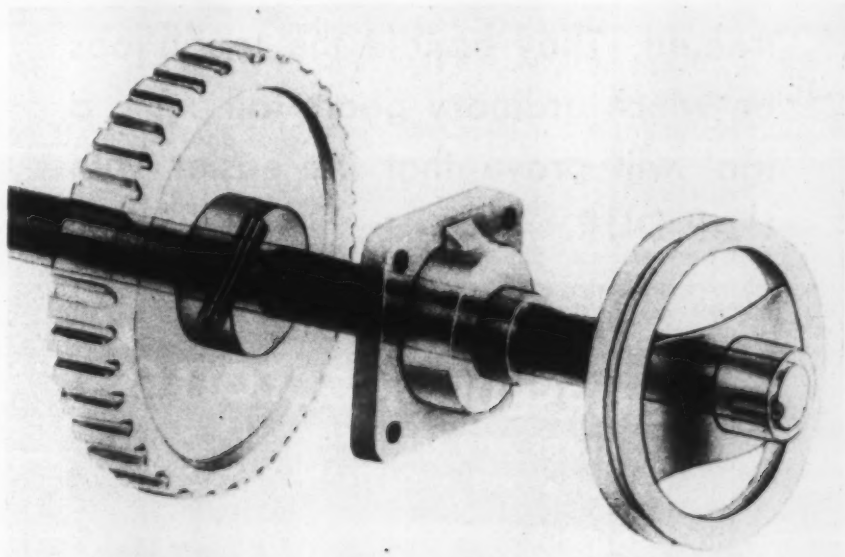
Rollpin is simply and rapidly inserted with hand tools or automatic jig assemblies, it is reported; removal is by driving it out with drift pin or pin punch. Locking characteristics are retained through repeated insertions, and other tests have shown that shear strength is high.

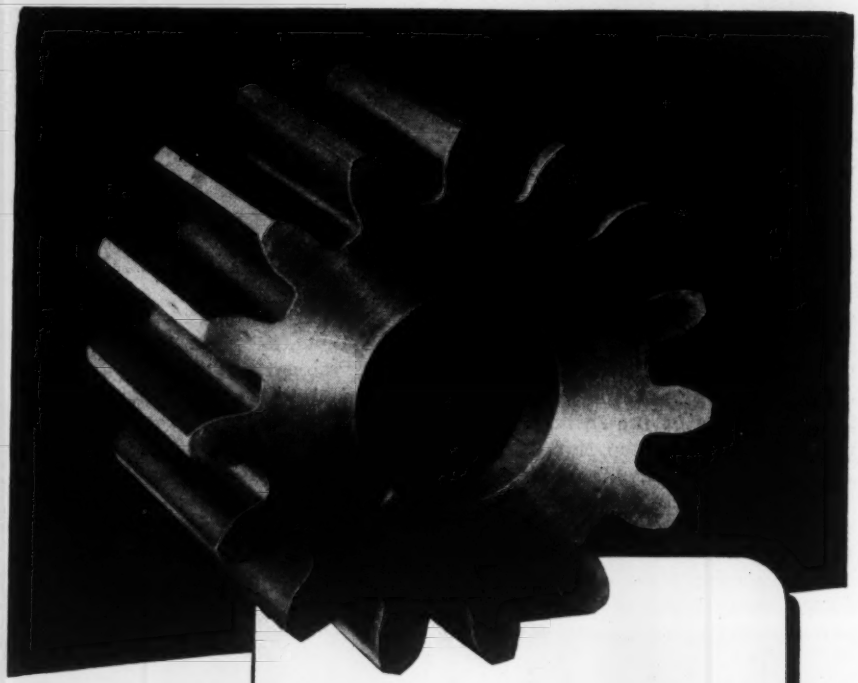
Uses Unlimited — Typical applications to date have been: To hold light gears on the shaft of a pump; on sprockets and linkages; use as a pivot or hinge pin on a tacker; pinning automobile vent window catch to handle shaft; for assembly of gear trains on a metering device; in the lubrication pump assembly of Cummins H-600 diesel engines; in feed tube finger clutch assembly for single and multispindle automatic screw machines.

In the latter installation, it is necessary for the pin to be flexed as many as 2400 times an hour. As the assembly is now performed, the entire job is said to be a much easier assembly, as the parts do not have to be lined-reamed with a taper reamer thus saving production time.

Rollpins are being made in 13 sizes to fit hole diameters ranging from 0.078 (5/64-inch) up to 0.500 (½-inch). They are available in stock lengths, beginning with 3/16-inch in the smaller diameters. Fasteners are made from SAE 1095 steel and type 420 stainless steel. Zinc and cadmium plated finishes may be specified, the company reports, although standard pins are not plated.

Self-locking pin used to secure pulley and gear to a shaft





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by Horsburgh & Scott

give 5 times the life and . . . at only 30% extra in cost. HARD-DUR Gears preserve the tooth form because they are made of the finest gear steels and are scientifically heat treated. They handle the tough jobs on which ordinary gears fail . . . a trial will prove that it's easier with HAR-DUR.

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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

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New Books

Production of Castings

Fundamentals in the Production and Design of Castings, by Clarence T. Marek, associate professor of manufacturing processes, Purdue University; cloth, 383 pages, 5¾ by 8½ inches; published by John Wiley & Sons Inc., New York; available from STEEL, Penton Bldg., Cleveland 13, O., for $4.00.

The author believes that the engineer has the responsibility of designing a part that will perform a certain function and that he must also design it so that it may be produced at the least expenditure of labor and material; hence, his book has as its principal objective that of correlating casting design with economical casting production. It is his opinion, that in order to direct design toward economical production, the engineer must be acquainted with the production process.

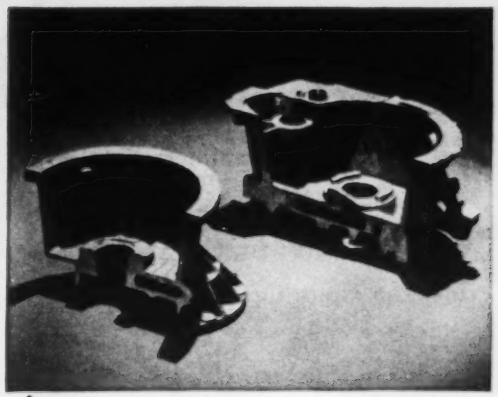
Making better than average use of drawings and sketches and interspersing numerous photographs, the author has compiled a book which includes an overall view of the casting industry, a description of basic molding processes and a background in the principles of metallurgy. Divided into 14 chapters, supplemented by bibliography, appendix and index, the book contains the theory of clay bond, description of high-voltage x-ray and supersonic inspection and a description of present-day production methods. Among the other subjects covered are foundry production equipment, production planning, design for economical molding and design to eliminate defects.

Manufacturers Register

California Manufacturers Annual Register 1950; cloth, 628 pages, 8 by 11 inches; published by Times-Mirror Press, Los Angeles, Calif.; available from STEEL, Penton Bldg., Cleveland 13, O., for $25.00.

This official directory information publication of the California Manufacturers Association is divided into four main sections: Alphabetical, with detailed information about California manufacturing concerns, including name, address, branch offices, number of employees, product, names of key executives and capital rating; trading areas and market sections geographically arranged, an alphabetical listing of all cities and towns with manufacturers listed alphabetically and products described; product section, listing manufacturers alphabetically under types of products made; brand and trade name section, listing alphabetically Cali-

Radiograph showing how the oil passage walls could be checked without damage to the casting.



Cutaway showing oil passage which required accurate and uniformly thick walls.

Only Radiography could check this vital specification

THIS sand cast aluminum housing for a high-altitude air pump included passages to carry oil at very high pressures. Specifications called for passage walls of accurate and uniform thickness.

There was one way to check this important specification—one sure way for the foundry to be absolutely certain of releasing only sound and satisfactory castings. Radiographic inspection was the way.

Radiography is becoming more and more routine with foundries assigned important tasks. On critical castings, such as this, it may be used to assure freedom from core shifts immediately before pouring and as a final casting inspection tool. Most valuable of all, radiography reveals internal defects during the pilot casting stage and suggests the changes needed to assure high yield in the production run.

Ask your X-ray dealer to explain the many ways radiography can increase your yield and better your foundry operations.

EASTMAN KODAK COMPANY
X-ray Division • Rochester 4, N. Y.

Radiography...
another function of Photography

Kodak
TRADE-MARK

COULD ANYTHING BE MORE CONVINCING THAN YOUR OWN EXPERIENCE?
Then give HERC-ALLOY the toughest chain job in your plant. Our asking for this test reflects the confidence given us by HERC-ALLOY service records from industry's leading plants.
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STEEL CHAIN

HERC-ALLOY is America's ***first alloy*** steel chain. For slings or other applications HERC-ALLOY Chain will prove that efficiency, safety and economy can go hand-in-hand.

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fornia manufactured products by the name under which they are stamped, packaged, labeled, advertised and sold.

In addition, the book contains an index of advertisers, the aims and activities of the CMA, statistical data and charts on California industry, trade, finance, agricultural, per capita and corporate wealth, etc., foreign trade, list of embassys, legations and consulates receiving the directory and a catalogue section. Use is made of different colored papers to differentiate between the sections.

History of Casting

A History of Steel Casting, cloth, 158 pages, 6 x 9 inches; published by District No. 1, Steel Founders' Society of America, Philadelphia; available from STEEL, Penton Bldg., Cleveland 13, O., for $2.50.

A general history of the ferrous foundry industry and reports on the origin of steel casting in Germany, Switzerland, England and the United States is the historical beginning of this new book which traces the steel casting industry's role in the economic growth of the United States. Prepared under the direction of William H. Worrilow, president of Lebanon Steel Foundry, Lebanon, Pa., and other industry leaders, the book actually is a detailed primer of steel casting production. It covers original methods and vast advances subsequently effected in furnace practice, process, molding, pouring, pattern making, cleaning and finishing, testing and inspection, and the wide variety of steel castings now available.

As more than 20 of the 33 steel foundries comprising the society's division No. 1 are located in states bordering the Delaware river, a full chapter is devoted to this historic industrial area which has served as a hub of this industry. Book contains about 50 photographs of plants, personalities and processes, drawings and sketches, many of them historic. An appendix lists past officers and directors of the 48-year-old technical society.

Manufactured Parts

Stress and Strength of Manufactured Parts, by C. Lipson, consulting engineer, G. C. Noll, project engineer, Thew Shovel Co., and L. S. Clock, assistant professor in applied mechanics, University of Detroit; cloth, 259 pages, 6½ x 9¼ inches; published by McGraw-Hill Book Co. Inc., New York; available from STEEL, Penton Bldg., Cleveland 13, O., for $4.50.

Based on sound theoretical laws, but practical in approach, this book will enable designers, engineers and metallurgists to obtain the specific data necessary for the prevention and elimination of failures in manufac-

tured parts and assemblies which may arise from defective design, defective metallurgy, production processes, etc. The first section presents in a concise manner basic facts governing stress and strength. Data charts pertaining to the subject comprise the second part of the book.

Concept of the book is that proper design involves not only stress consideration, or only strength considerations, but the proper balance between the two. It shows the designer how to formulate a design strong enough to withstand service loads and yet be light enough to be economically feasible. It also enables the metallurgist to specify materials sufficiently durable for the service loads and yet not necessarily requiring special alloys and heat treatments. Twenty-six illustrations in the first section and 175 charts in the second, along with supplementary data, references and author references complete the book, now in its first edition.

Welding Handbook

Welding Handbook, edited by Simon A. Greenberg; cloth, 1650 pages, 6¼ by 9¼ inches; published by American Welding Society, New York; available from STEEL, Penton Bldg., Cleveland 13, O., for $12.00 in the United States and Canada, $13.00 elsewhere.

More than 30 welding and cutting processes in use by industry today; the welding of ferrous and nonferrous metals and alloys and the application of welding in different industries are covered in the 65 chapters of this book, now in its third edition. Also included are individual chapters on cost estimating, welding metallurgy, physics of welding, a dictionary of welding terms, general engineering tables, welding symbols, filler metal specifications, inspection, and others. A bibliography at the end of each chapter lists the important codes, standards, books and technical articles on the subject.

Over 300 tables in the handbook make it useful for reference and illustrations are used to show welding equipment, welding details and specific application. With the 69-page index, it is possible to easily find specific information and related information contained in different chapters. Both index and text are effectively cross-referenced. The two-columns-per-page format makes the book easier to read. Index items have been grouped by welding processes, metals, applications and are further grouped under engineering headings, such as design, workmanship, inspection, etc. Each item is also separately listed in alphabetic order.

Our method saves you time and labor figured not only in minutes, hours, days or months, but SECONDS AS WELL, through the remarkable speed of

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In fact, you can **DRIVE SCREWS AS FAST AS ONE A SECOND;** a tremendous gain over the old show hand method—Any kind of screws; machine, wood, brass, self-tapping, sheet metal screws, standard heads, special heads.

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steel strip from continuous coils . . .

FOLLANSBEE COLD ROLLED STRIP feeds right from the coil into your automatics—a continuous supply of uniform strip steel for any kind of forming operation. Manufactured to your specifications Follansbee Cold Rolled Strip is available in tempers and finishes for most industrial applications.

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FOLLANSBEE COLD ROLLED STRIP is production-line steel strip with machining characteristics suitable for freezers or furniture or fixtures. Regardless of the forming operation involved, the continuous feeding of Follansbee Cold Rolled Strip from coils saves time and labor and material.

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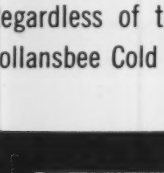
FOLLANSBEE COLD ROLLED STRIP and Follansbee Polished Blue Strip are both furnished in continuous coils that keep automatics in action for real productioneering teamwork. To help you select coil diameters and weights, we'll send you without charge a Follansbee Coil Weight Calculator. Just write us on your business letterhead.



Teeth by Microscope

Lenses are not the only part of telescopes which must be precisely and exactingly made. Upon the precise spacing of the teeth on a 7-foot diameter right ascension worm gear depends the ability of the telescope to "track" in order to hold a star motionless on a photographic plate for a matter of hours.

According to Warner & Swasey Co., Cleveland, manufacturer of a 24-inch Schmidt-type telescope for the University of Michigan, conventional gear cutting methods are unsuitable for such work, the gash method being employed on equipment specially built by the company's instrument specialists. Each tooth is cut separately, with a circuit of roughing cuts being followed by the finish cutting of consecutive teeth. Only a few thousandths of an inch of material is removed in the finish cutting operation.

Two Score and Ten—Gears to be cut are positioned for clamping by microscopic of graduations on a finely divided circle. Actual cutting was performed on a 40-inch automatic dividing engine lathe designed and built by one of the founders of the company, Ambrose Swasey, over 50 years ago. Said to be the most accurate machine of its type in existance yet today, it has a maximum error of only one second of arc, equivalent to ⅛-inch subtended at a distance of 1 mile. Although the graduations on the machine are so fine that they can scarcely be seen with the naked eye, the width of each line is 12 times the maximum error the machine can produce.

Alloy Steel Ups Valve Life

Required to withstand terrific service pressures and corrosion factors are valve bodies fittings and similar parts for use in gas-condensate wells. Development of a 12 per cent chromium alloy steel for casting by Lebanon Steel Foundry, Lebanon, Pa., is expected to mean savings of many dollars in equipment life, operating safety and minimization of costly service failures in the steel.

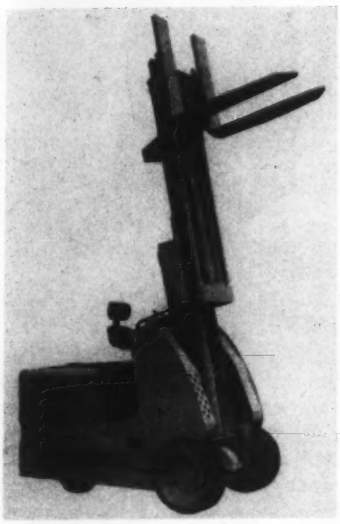
It is said that corrosion conditions in certain gas-condensate wells were found to destroy vital control parts of well-head valve equipment in as little as 30 to 90 days of service. It is reported that installation of the new alloy parts has arrested the corrosion and provided an effective deterent to the severe pitting and edge attack of gases and acids encountered at high pressures and velocities.

Known as Circle L-12, the alloy is said to posses physical properties sufficient to withstand the high internal

New Products and Equipment

Medium Capacity Lift Truck

Features of three medium capacity sitdown model electric industrial trucks offered by Automatic Transportation Co., 149 W. 87th St., Chicago, Ill., include location of all electrical controls in a single enclosed panel, tiering to 124 inches despite collapsed mast height of 83 inches, use of a control system which,



combined with silicone insulation, affords good protection for the motor.

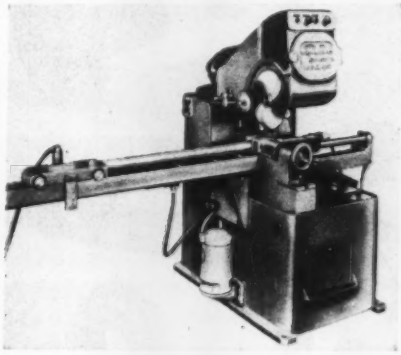
The Skylift trucks are rated for 4000, 5000 or 6000 pound loads and are known as the LFS series trucks. Seat is padded with foam rubber and has an adjustable back rest. Tilt ram packing automatically compensates for wear. Either solid or cushion type tires may be used interchangeably.

Check No. 1 on Reply Card for more Details

Circular Sawing Machine

Ferrous or nonferrous materials up to 3 inches round or square may be rapidly and accurately cut off on the model No. 00-G circular sawing machine, manufactured by Motch & Merryweather Machinery Co., Penton Bldg., Cleveland 13, O. Angular cutting up to 45 degrees is made possible by inserting clamping jaws of the desired angle and moving the supporting stock conveyor. Where it is not convenient to move the conveyor, the machine can be mounted on a swivel base allowing it to be moved to the desired cutoff angle.

Stock can be fed into the machine either manually or by an automatic air-powered stock feeder for standard lengths up to 24 inches, with additional lengths available for special applications. Special gaging and holding fixtures for odd shaped extrusions and intricate parts may be adapted to the machine. Gravity feed of the one-piece saw head is

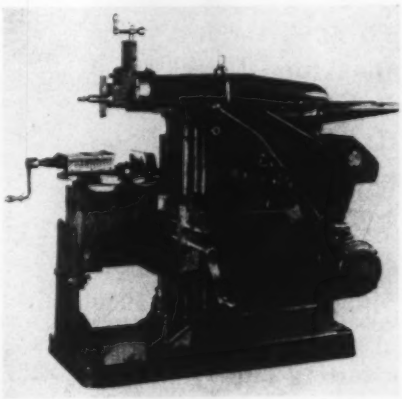


controlled by a hydraulic flow control valve. Saw blade is driven by the direct drive geared saw head. Changes of sawing speeds are made by pick-off gears.

Check No. 2 on Reply Card for more Details

Shaping at High Speed

Having a 14-inch stroke and 26-inch ram, the high speed floor model shaping machine available from DCMT Sales Corp., 164 Duane St., New York 13, N. Y., has four speeds varying from 27 to 140 strokes per minute. Both base and body are



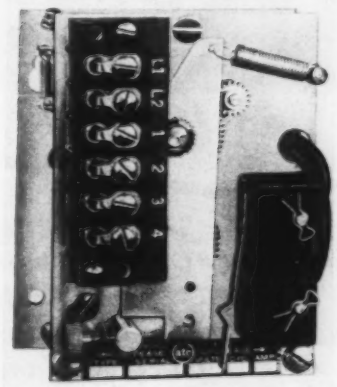
heavily cast and of sturdy construction, internally ribbed. Ram slides are of V-section with large bearing areas. Table is of box-section with machined T-slots and a strong adjustable table support.

Automatic horizontal feed motion gives four variations of feed per ram stroke. Drive is from self-contained motor and is transmitted by three V-belts through a Matrix multiple-disk friction clutch to a totally enclosed four-speed box. Table surface measures 10 x 44 inches while maximum distance from ram to table is 16 inches. Longitudinal traverse is 16 inches and vertical traverse is 14 inches. Maximum down feed of tool head is 5 inches.

Check No. 3 on Reply Card for more Details

Resetting Delay Timer

Automatic Temperature Control Co. Inc., 5212 Pulaski Ave., Philadelphia 44, Pa., is offering a synchronous motor-driven time delay for use in electrical and electronic apparatus such as machine tools, tube protection and signal systems. The type 5600 delay timer is powered by a Telechron motor, utilizing a tripping arm which is driven through a train of machine cut spur gears and a snap-acting single pole, double throw pre-



cision switch which opens or closes an auxiliary circuit.

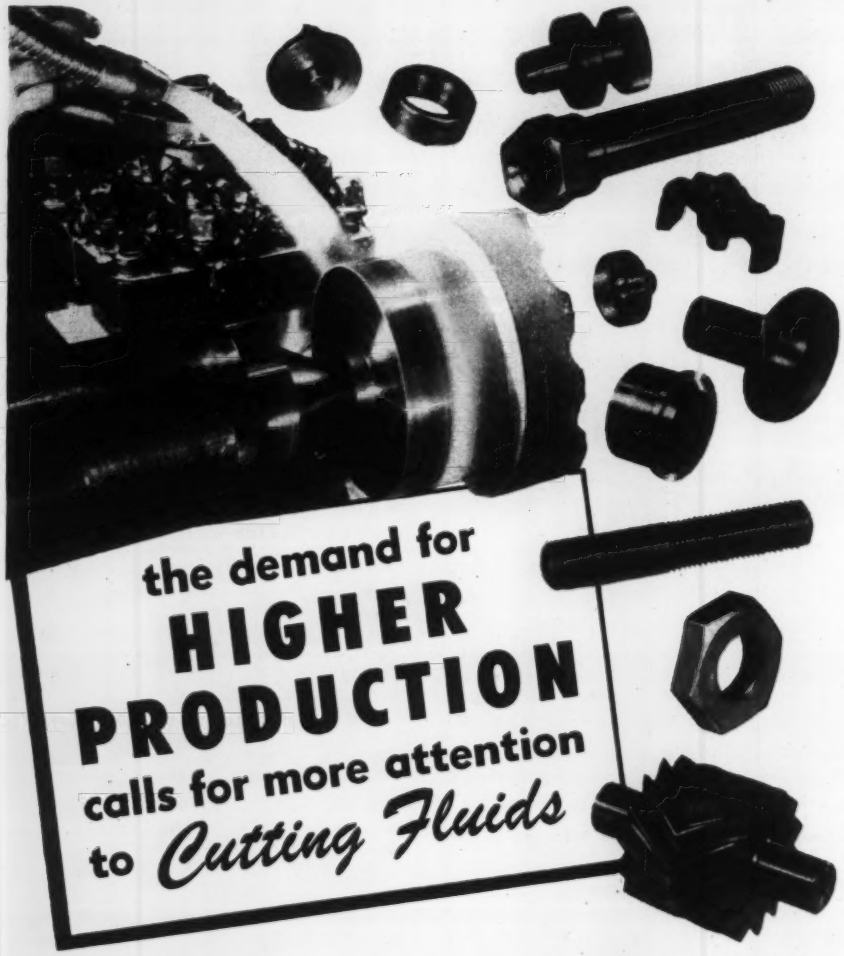
Instantaneous resetting is by an electro-magnetic coil which clutches and declutches a trip locking gear as required. Timer is rated for operation from 115 or 230 v, 25, 50 or 60 cycles. A line of standard ranges from 0.75 seconds to 30 minutes is available.

Check No. 4 on Reply Card for more Details

Friction Roll Feed

Stock in widths of 3, 5, 7 and 9 inches may be handled by the automatic friction roll feed developed by Benchmaster Mfg. Co., 2952 W. Pico Blvd., Los Angeles 6, Calif. Stroke is adjustable from 0 to 3 inches and maximum thickness capacity which may be handled is 3/16-inch. While designed for presses made by the company, unit may be adapted to almost all presses.

Feed is equipped with an angle bracket mounting on the press bed or bolster plate, permitting vertical ad-



★ ***PRODUCTION INCREASED FROM 18 to 31 PIECES PER HOUR*** machining pipe union from 18-8 stainless steel in single spindle automatic *after* changing over to Stuart's THREDKUT 99.

★ ***SPEEDS, FEEDS INCREASED 50%*** turning, drilling, facing, reaming, tapping forged steel valve bodies (equivalent SAE 1315) on turret lathe after applying Stuart's SOLVOL water soluble cutting fluid concentrate. And, excessive scrap loss due to high finish requirements was eliminated.

★ ***PRODUCTION DOUBLED*** boring 7½" dia. hole through 11" dia. x 30½" long solid forged 5060 steel pump liner through use of Stuart's SPEEDKUT B the multi-purpose cutting fluid.

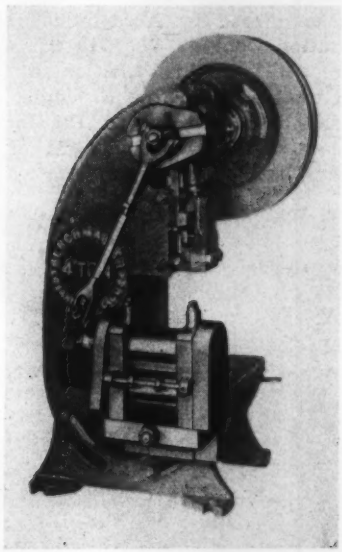
Our 85th Anniversary Year

• These are not isolated examples of how Stuart products and Stuart experience can help boost production. They are taken from daily field reports. Ask to have a Stuart Representative call. Send for your copy of "CUTTING FLUID FACTS," an interesting educational booklet.

D.A. Stuart Oil Co.

2735-37 So. Troy St., Chicago 23, Illinois

justment to align rolls with the die. Rolls are driven from a special crankshaft adapter which is attached to the end of the press crankshaft opposite the flywheel. Adapter is equipped with a tee slot in which the crank pin can be set for any desired throw



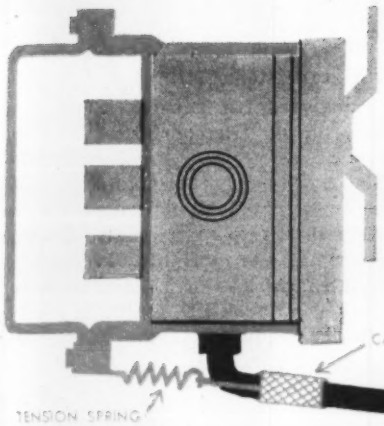
within its range. The crank is linked to the friction clutch and roll mechanism through an adjustable length shaft. Direction of feed is readily reversible. Unit can be positioned in three ways: Left to right, right to left or front to back, with either a push or pull feed.

Check No. 5 on Reply Card for more Details

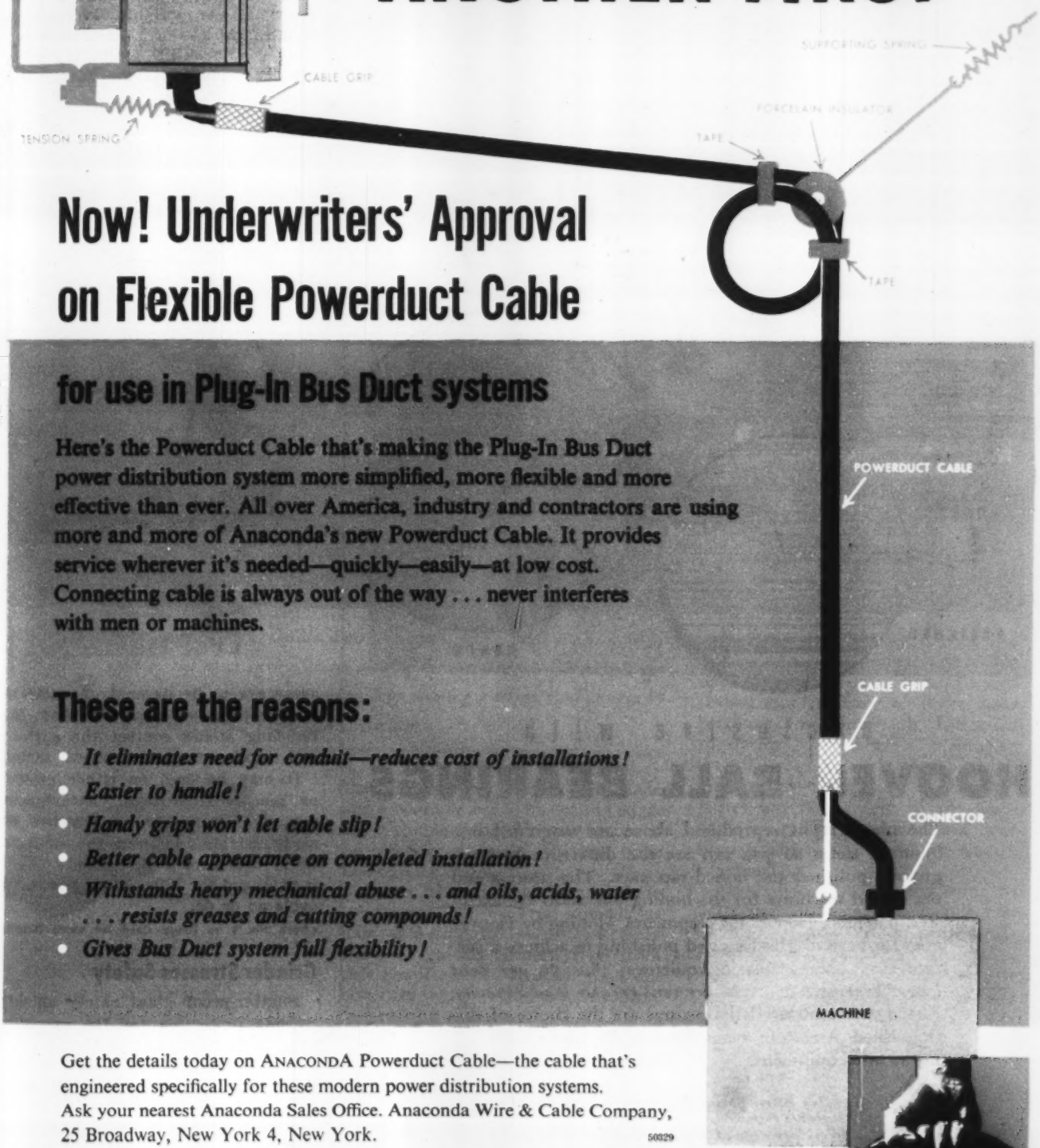
Fork Shovel Truck Attachment

The handling of such loose materials as castings, forgings, coal and stone is expedited by a heavy-duty fork-shovel attachment for lift trucks, built by Industrial Truck Division, Clark Equipment Co., Battle Creek, Mich. The 7¾-inch long tapered

tines are designed to ease their way into and under materials with minimum tractive effort. The hydraulically controlled shovel can be tilted up to 40 degrees above horizontal, including 10 degrees tilt of the up-



ANOTHER "FIRST"



Now! Underwriters' Approval on Flexible Powerduct Cable

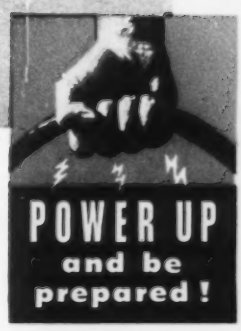
for use in Plug-In Bus Duct systems

Here's the Powerduct Cable that's making the Plug-In Bus Duct power distribution system more simplified, more flexible and more effective than ever. All over America, industry and contractors are using more and more of Anaconda's new Powerduct Cable. It provides service wherever it's needed—quickly—easily—at low cost. Connecting cable is always out of the way . . . never interferes with men or machines.

These are the reasons:

- *It eliminates need for conduit—reduces cost of installations!*
- *Easier to handle!*
- *Handy grips won't let cable slip!*
- *Better cable appearance on completed installation!*
- *Withstands heavy mechanical abuse . . . and oils, acids, water . . . resists greases and cutting compounds!*
- *Gives Bus Duct system full flexibility!*

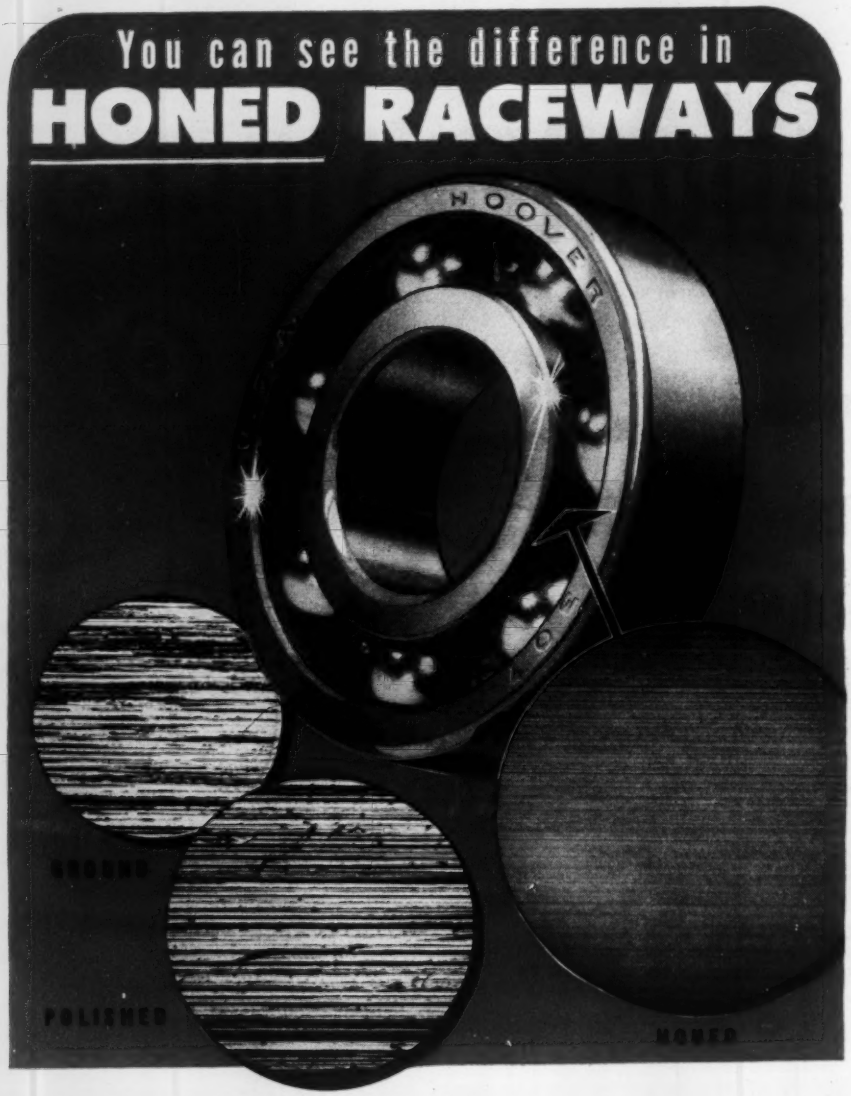
Get the details today on ANACONDA Powerduct Cable—the cable that's engineered specifically for these modern power distribution systems. Ask your nearest Anaconda Sales Office. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. 50329



The right cable for the job ANACONDA®

WIRE AND CABLE

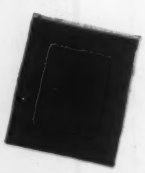
You can see the difference in
HONED RACEWAYS



exclusive with
HOOVER BALL BEARINGS

The photographs reproduced above are magnified one hundred times so you can see the difference between ground, polished and honed raceways. The process and the special machines for the honing operation are exclusive, patented, Hoover developments. Honing by Hoover goes far beyond grinding and polishing to achieve a surface that assures amazing quietness plus *90 per cent longer bearing life . . . 30 per cent greater load capacity.* That's why Hoover Ball Bearings are the choice of distinguished American manufacturers of fine machines and equipment.

The Hoover Engineering Manual will be mailed free to engineering and purchasing executives requesting a copy on their business letterhead.



THE ARISTOCRAT OF BEARINGS
HOOVER BALL and BEARING CO.
Ann Arbor, Michigan

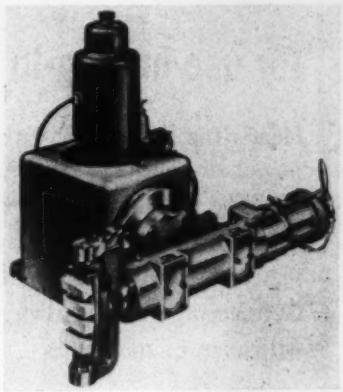
right assembly, permitting it to scoop up maximum loads without having to ram the stock pile.

Backward tilt assures security of loads during transportation. Hydraulic controls perform the dumping action. Actuated by an auxiliary valve, the fork shovel manipulation has no effect on the lifting operation or on tilting of the uprights. It may be installed on gas or electric powered Clark Carloader and Utilitruc models and on gas-powered Yardlift-40 and Yardlift-60 models.

Check No. 6 on Reply Card for more Details

Superfinishing Attachment

Gisholt Machine Co., Madison 10, Wis., is making available a No. 4 superfinishing attachment for mounting on engine lathes or other suitable equipment to be used for either cylindrical or flat work wherever large



areas are to be covered. As attachment is traversed along the work, the finishing stones contact the surface and scrub away amorphous metal.

It may be used on either ground or machined surfaces. Attachment can give up to 100 psi pressure on an adjustable oscillation rate of from 42 to 250 strokes per minute. Unit is arranged for 220v, single phase, 60 cycle ac or dc.

Check No. 7 on Reply Card for more Details

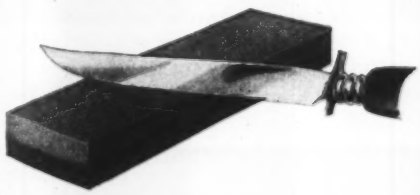
Grinder Stresses Safety

Shatter-proof glass safety shields provide protection for the operator of a 1/3-hp grinder announced by Delta Power Tool Division, Rockwell Mfg. Co., Milwaukee 1, Wis. Other features include a steel spark guard at the top of each wheel, tool rests adjustable to any grinding angle, a three-wire cord which may be grounded and balancing of motor and wheels to keep the machine free of vibration.

Motor has lubricated-for-life ball bearings. Motor housing, end bells, wheel guards and base are heavy

A stone fit to sharpen Saladin's scimitar

TO demonstrate the might of Christian arms during the Third Crusade, Richard of England split a steel mace with a single blow of his broadsword. Whereupon the Moslem leader, Saladin, is said to have countered by severing a silken scarf simply by letting it settle on the edge of his razor-sharp scimitar.



While you may not want your cutlery *quite* as sharp as Saladin's fabulous scimitar, it's still a fact that the difference between a good blade and a poor one lies in its cutting edge. It's also a fact that knives sharpened on a stone of ALCOA Alumina have *keen* cutting edges.

ALCOA Alumina is aluminum oxide —a crystalline material almost as hard as a diamond—with extremely sharp edges and corners. It is from this characteristic that alumina derives its value as an outstanding, fast-cutting abrasive.*

A material of uniform purity and quality, ALCOA Alumina is only one of the versatile ALCOA Chemicals used throughout industry to make *better* products do a *better* job. Electrical insulators . . . rubber . . . abrasive wheels . . . glass . . . lumber . . . high temperature refractories . . . tooth paste—are but a few of the hundreds of products which have been measurably improved by ALCOA Chemicals.

Maybe we have just the thing to help *your* business. Let us tell you more about these versatile chemicals that others have used so successfully. Write to: ALUMINUM COMPANY OF AMERICA, CHEMICALS DIVISION, 622J Gulf Building, Pittsburgh 19, Pa.

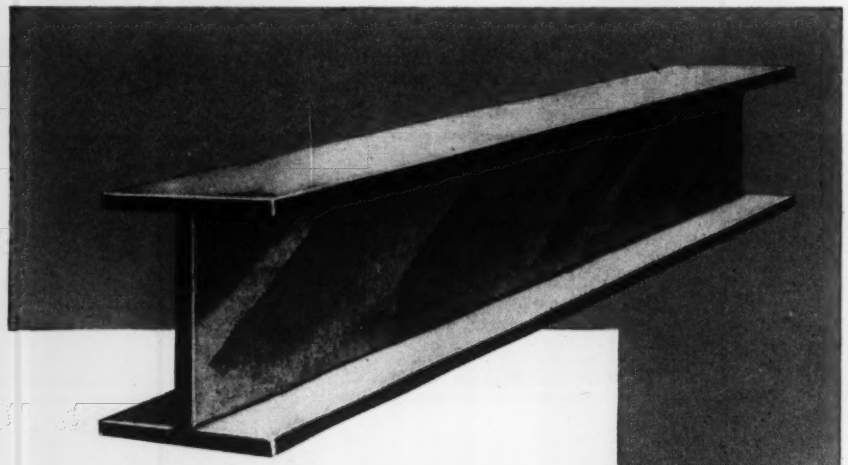
*ALCOA *does not make sharpening stones. Buy cream- to buff-colored aluminum oxide stones from your hardware dealer.*

Alcoa Chemicals

ALCOA ®

ALUMINAS and FLUORIDES

ACTIVATED ALUMINAS • CALCINED ALUMINAS • HYDRATED ALUMINAS • TABULAR ALUMINAS • LOW SODA ALUMINAS
ALUMINUM FLUORIDE • SODIUM FLUORIDE • SODIUM ACID FLUORIDE • FLUOBORIC ACID • CRYOLITE • GALLIUM

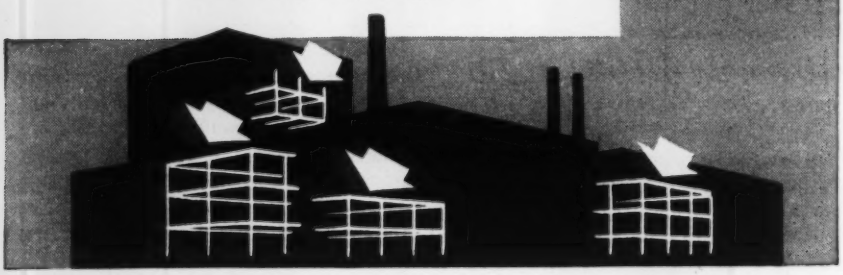


We can put this

STRUCTURAL STEEL

anywhere in your plant...

for an expansion or rebuilding program



WHERE will you have your structural steel? Fort Pitt Bridge will supply the structural steel, or assume the complete responsibility for the structural steel and erection. *Your job will be on time, too!* On any job involving the use of structural steel for new construction or modernization, use the unexcelled fabrication facilities and experienced engineering of the Fort Pitt Bridge organization.

"Steel Permits Streamlining Construction with Safety, Endurance and Economy"

AISC — American Institute of Steel Construction, Inc. — Founded 1921

FORT PITT BRIDGE WORKS

Member American Institute of Steel Construction

General Offices, Pittsburgh, Pa. . . . Plant at Canonsburg, Pa.

BRANCH OFFICES

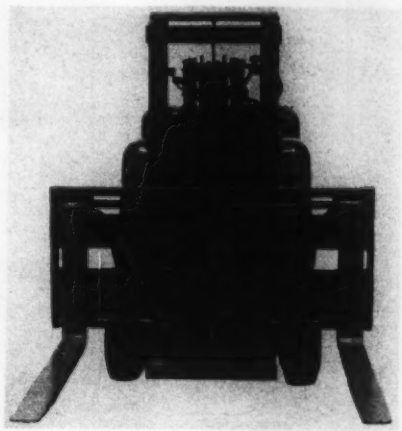
NEW YORK, N.Y. . . 441 Lexington Avenue
CLEVELAND, OHIO . . . . Bulkley Building
COLUMBUS, OHIO . Huntington Bank Bldg.
DETROIT, MICHIGAN . New Center Building

iron castings. Grinder measures 20 inches from side to side with safety shields and is 9 inches high and 8 inches deep. End bells extending beyond motor-housing frame provide working room on both sides of grinding wheels.

Check No. 8 on Reply Card for more Details

Forks Adjusted Hydraulically

Operator of a fork lift truck may quickly and accurately vary the distances between truck forks at any time by means of a control lever of an attachment made by Towmotor Corp., Cleveland, O. Adjustable forks are designed for fork lift



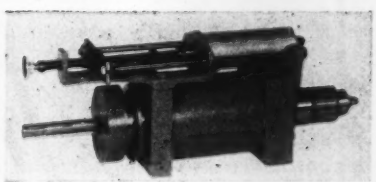
trucks operating on close time schedules which are required to handle pallets or materials of different widths.

By permitting the operator to regulate the distance between the forks without leaving his seat while the truck is in motion, the attachment will in some instances make it possible for one fork lift truck to do the work of two. Shown is the model LT-48 Towmotor fork lift truck equipped with the adjustable forks.

Check No. 9 on Reply Card for more Details

Drills, Taps Automatically

Utilizing either hydraulic or pneumatic power, a high speed precision automatic drilling and tapping unit, made by HyPneuMat Inc., 647 W. Virginia St., Milwaukee 4, Wis., of-



fers one stroke or continuous cycling and has a rotating and reciprocating spindle and speeds up to 20,000 rpm. Drilling and tapping capacity is ⅜-inch steel. Stroke is variable from ⅛

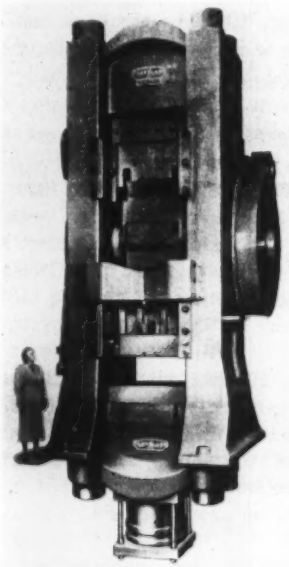
to 3½ inches. Feed is infinitely adjustable and stroke is adjustable in both directions. Spindle speed may be varied and dwell action may be adjusted from 0 to 120 seconds.

Control may be by hand or foot. At 100 psi air or hydraulic pressure, the unit delivers more than 700 pounds tool point thrust on the work. It is available with a variety of electric and mechanical controls for almost every production need.

Check No. 10 on Reply Card for more Details

Knuckle Joint Press

Cleveland Punch & Shear Works Co., Cleveland 14, O., is producing a double-geared, twin drive, knuckle joint press which is equipped with air friction clutch and bar knockout in slide. Press is built with an air cushion in the bed and with pads



on uprights and rear of slide for mechanical pick-off attachment.

Stroke of slide is 10 inches and adjustment of slide is ½-inch. Shut height is 30½ inches. Face of slide measures 30 x 36 inches and area of bed is 42 x 48 inches. Machine is capable of 14 rpm and has a capacity of 2500 tons. The cushion has a 50-ton capacity of 75 pounds air pressure, with 3 inches of travel.

Check No. 11 on Reply Card for more Details

Conveyor Has Cleated Belt

Rough or smooth surface containers and materials may be transported by a permanently mounted power belt conveyor developed by Rapids-Standard Co. Inc., 342 Rapistan Bldg., Grand Rapids 2, Mich. The cleated Floor-Veyor will move these materials at inclines up to 45 degrees. It is built of 10 gage steel box-channel bed, rigidly cross-braced

Just another sheep?
You don't have to be an expert to tell that this fellow is a top producer of wool because it literally "sticks out all over him." Many generations of breeding toward a specific purpose thus show their effective result.
The production-ability of a Clearing press doesn't show on the surface, but experienced metal-working men know it's there because they've seen Clearings on the job. Painstaking and forward-looking engineering through the years have given Clearing presses the rigidity, the fact action, the precision, the low maintenance demands that add up to lower production costs and greater man-hour output.
When you buy a press, look below the surface. Be sure you get Clearing construction and features that mean top performance and maximum profit in operation.
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and trussed to prevent deflection. Four belt widths from 12 to 24 inches are offered; either slider or wheel bed is available in standard lengths of 10 to 40 feet.

Capacity of each conveyor depends upon size of motor, bed construction and operating pitch. Standard reversible belt speed is 50 feet per minute, with other speeds available. A triple nosed-over delivery section promotes smoother transfer of goods from inclined belt to horizontal plane or vice versa. Motor switches may be operated from either end of the unit. A choice of belts and cleat spacing is offered.

Check No. 12 on Reply Card for more Details

• • •

CHECKS FOG: Carhoff Co., Cleveland, O., announces No-Fog liquid for severe fogging conditions and No-Fog glass cleaner. The liquid is to clean as well as prevent fogging and steaming of eye glasses, goggles, welding lenses, photographic lenses, etc. The glass cleaner is used on windshields, windows and all large glass surfaces.

Check No. 13 on Reply Card for more Details

PUSH-PULL CONTROL: A line of preassembled and preformed push-pull controls designed for efficient transmission of motion is available from Simmonds Acrocessories Inc., Tarrytown, N. Y. Basic elements of the control are a moving member, or linkage, enclosed in either a rigid or flexible casing or a combination of both. Two types of linkage are available.

Check No. 14 on Reply Card for more Details

CARRY OIL RESERVOIR: Bost-Bronz bearings, introduced by Boston Gear Works, Quincy 71, Mass., carry their own oil reservoir providing an oil film that is always present on every surface. It is relubricated by applying oil to outer surface. Oil is absorbed by capillary attraction.

Check No. 15 on Reply Card for more Details

FLUORESCENCE DETECTOR: An ultraviolet light source with inbuilt dark chamber to make possible fluorescence detection and comparison in daylight is announced by Menlo Research Laboratory, Menlo Park, Calif. Known as the Fluoretor, it is a portable self-contained unit.

Check No. 16 on Reply Card for more Details

BONDING METHOD: Miccroloid primer for all metal finishes, announced by Michigan Chrome & Chemical Co., Detroit 7, Mich., is quick drying and flexible. It acts as a rust inhibitor and protects metals before painting. It forms insoluble phosphates at the metal surface and prevents corrosion from creeping beneath the paint film. Primer can be applied by spraying, dipping or brushing.

Check No. 17 on Reply Card for more Details

MARKS HOT METAL PRODUCTS: Ingot, cut, heat and weight numbers or letters are stamped at the same time on steel ingots, billets, bars and other hot metal products with a new single stroke pneumatic marker offered by Pannier Corp., Pittsburgh 12, Pa. It has an automatic head trip; holds up to 12 interchangeable ¼-inch grooved steel type characters.

Check No. 18 on Reply Card for more Details

BUSHINGS FITTED CLOSELY: Ampco metal guide post bushings, available from Diemakers Supplies Inc., Detroit 11, Mich., can be fitted closely providing maximum supporting alignment for costly punches and dies. They will not gall or cause sheared or broken die members, score, seige or rust.

Check No. 19 on Reply Card for more Details

COLLECTS VAPOR: Aget-Detroit Co., Ann Arbor, Mich., offers a new high volume, self-contained collector for vapor and mist. Model VC-5 vapor collector develops 3600 cfm at 5 inches water lift through an 8-inch inlet with its 5 hp motor and collects vapor and mist from screw machines, centerless grinders, chucking machines, etc.

Check No. 20 on Reply Card for more Details

CHECKS ON REJECTS: Designed to keep an automatic, continuous check on reject rates in manufacturing operations, the quality control indicator introduced by General Electric Co., Schenectady 5, N. Y., makes possible the location and remedy of abnormal production difficulties.

Check No. 21 on Reply Card for more Details

DIAPHRAGMS: Connecticut Hard Rubber Co., New Haven 9, Conn., offers diaphragms made from Cohrlastic 3500. They are light and strong and operate from minus 75° F to plus 300° F and are extremely flexible.

Check No. 22 on Reply Card for more Details

SINGLE PHASE MOTORS: Sterling Electric Motors Inc., Los Angeles, Calif., announces single phase capacitor type motors have been added to their line of Klosd drip-proof motors. They may be sidewall mounted, inverted ceiling mounted or floor mounted and still retain the drip-proof feature by rotating end bells so that air vent openings point downward. Units have a starting relay that eliminates necessity of centrifugal switches or rotating devices.

Check No. 23 on Reply Card for more Details

CONTROLS SCALE: A unit that controls scale formation in boilers, compressors, air conditioning systems and other equipment using water, is announced by Aqua Electric Scale Control Inc., Cleveland 15, O. Its electrode creates a physical change in water content controlling the scale forming elements.

Check No. 24 on Reply Card for more Details

BAR TRUCK: Heavy duty bar trucks of steel channel and I-beam construction are introduced by Palmer-Shile Co., Detroit 27, Mich. Units are tilt type for easy handling of long stock and are reinforced all steel welded construction. They can be built to handle any load capacity.

Check No. 25 on Reply Card for more Details

ELECTRIC SWITCH: A cartridge type hydraulic pressure electric switch is announced by Pantex Mfg. Corp., Pawtucket, R. I. Designed for precise control of electric circuits by means of hydraulic-pressure actuation, it will cut in and cut out electric circuits with as little as 12 to 18 per cent pressure differential. It operates immediately with every start of the pump and requires no pressure build up.

Check No. 26 on Reply Card for more Details

MEASURES PENETRATION: Precision Scientific Co., Chicago 47, Ill., has developed the Penetrometer timer to measure penetration. Operator flicks the timer control switch to on position and needle is freed to allow penetration for exactly 5 seconds. Needle is then gripped and held immovable. Timing is made precise by a synchronous motor and cam actuating a microswitch to a solenoid which holds the needle shaft.

Check No. 27 on Reply Card for more Details

FOR MORE INFORMATION
on the new products and equipment in this section, fill in a card. It will receive prompt attention.

Market Summary

IMPACT of military and related demands on the steel market is increasingly in evidence. Civilian goods manufacturers' procurement difficulties are mounting in step with accelerated defense efforts. More and more they are being forced to stand aside as the mills divert steelmaking facilities to production for government emergency account.

ALLOCATIONS— Voluntary allocations to government and related programs are working out well so far as supplying these needs are concerned. But they are giving rise to dissatisfaction among regular customers. They are beginning to play hob with rolling and shipping schedules, necessitating shipment deferments and reductions in customers' quotas. Widening gaps in civilian steel supply banks are appearing and these promise to grow progressively worse. Naturally, consumer complaints are increasing as the scramble for supplies intensifies.

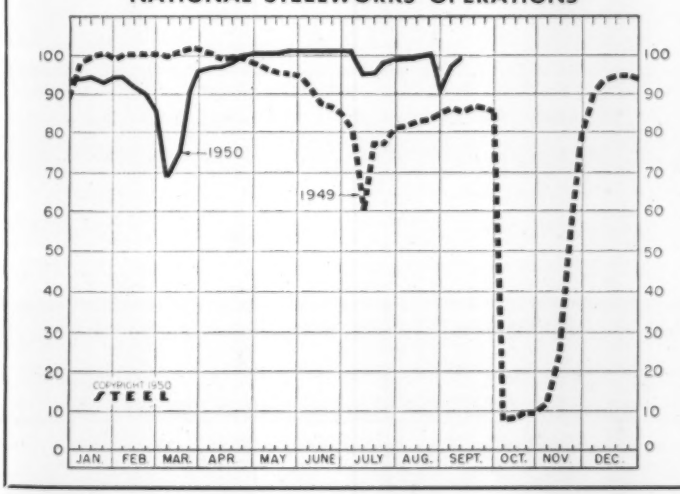
SUPPLY— To date, military and accompanying needs comprise a relatively small percentage of the tonnage on steelmakers' order books. But the tonnage is rising steadily and the mills are giving such right-of-way in rolling schedules, in many instances at expense of regular commercial orders. Meanwhile, with each shipment deferment or quota cutback customers rush into the market in a frantic effort to cover requirements as far ahead as possible. Much duplicated tonnage inquiry is believed circulating among the mills. Little success is attending buyers' efforts to get protective coverage since even the premium conversion and gray markets are jammed with tonnage and offer little in the way of encouragement under present conditions.

GRAY MARKET— With consumers' quotas for fourth quarter cut sharply and further cuts likely as military needs develop, buyers are turning in every direction for tonnage. Warehouses are being flooded with inquiries they cannot handle. Producers on conversion account are committed months ahead and there is practically no open rolling capacity available even where consumers can provide semifinished steel. As a result, gray market activities are increasing noticeably. But they are not comparable with those of two or three years ago. Actually, little tonnage is flowing into gray market channels since the steelmakers are maintaining a tight grip on all tonnage leaving their plants. One mill inserted a clause in contracts stipulating return of tonnage in event it becomes surplus. Several instances are reported where buyers have been cut off from original suppliers because they resold steel in the gray market.

PRODUCTION— Only a few furnaces shut down over Labor Day, permitting steelmaking operations to rise 1 point to 98.5 per cent of capacity. This is equivalent to about 1.9 million tons in the week. District rates last week rose 5.5 points to 99 per cent in Chicago, 4 points to 106 in the Far West, 2.5 points to 94.5 at Cleveland, and ½ point to 101.5 at Pittsburgh. These gains were partially offset by declines of 11 points to 78 in St. Louis, 3 points to 103 in Youngstown, 2.5 points to 95 in Wheeling, 2 points to 108 in Detroit. Ingot production rate held at 104 in Buffalo, 103 in Cincinnati, 100 in Birmingham, 98.5 in eastern Pennsylvania, and 65 in New England.

PRICES— Fairly stable conditions prevailed in the scrap market last week although STEEL's composite on steelmaking grades rose to $41.08 from $40.92 the preceding week. Steelmakers' efforts to stabilize this market appear to be meeting with some success. Few changes of note were reported in the finished steel market. STEEL's weighted index on finished steel products held unchanged at 156.99 as did the arithmetical price composite at $94.50. Pig iron composites also were unchanged with No. 2 foundry, $46.85, basic, $45.97, and malleable, $47.49.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

Percentage of Capacity Engaged at Leading Production Points

	Week Ended Sept. 9	Change	Same Week 1949	Same Week 1948
Pittsburgh	101.5	+ 0.5*	79.5	93.5
Chicago	99	+ 5.5*	92	94.5
Eastern Pa.	98.5	0	81	92
Youngstown	103	— 3	94	103
Wheeling	95	— 2.5	92	90.5
Cleveland	94.5	+ 2.5	99.5	89.5
Buffalo	104	0	98.5	106.5
Birmingham	100	0	100	100
New England	65	0	77	80
Cincinnati	103	0	95	102
St. Louis	78	—11	87	91.5
Detroit	108	— 2	92	100
Western	106	+ 4	82	..
Estimated national rate	98.5	+ 1	85	95

Based on weekly steelmaking capacity of 1,906,267 net tons for first half and 1,926,803 second half, 1950; 1,843,516 net tons for 1949; 1,802,476 net tons for 1948. *Change from revised rate.

News Summary—p. 57 *Production-Engineering News—p. 87*

Composite Market Averages

	Sept. 7 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
FINISHED STEEL INDEX, Weighted:					
Index (1935-39 av.=100)	156.99	156.99	156.99	152.52	101.85
Index in cents per lb. ..	4.253	4.253	4.253	4.132	2.759
ARITHMETICAL PRICE COMPOSITES:					
Finished Steel, NT	$94.50	$94.50	$94.36	$91.55	$58.27
No. 2 Fdry. Pig Iron, GT	46.85	46.85	46.85	46.10	24.67
Basic Pig Iron, GT	45.97	45.97	45.97	45.60	24.00
Malleable Pig Iron, GT..	47.49	47.49	47.49	47.27	25.29
Steelmaking Scrap, GT..	41.08	40.92	38.58	25.17	19.17

Weighted finished steel index based on average shipments and Pittsburgh district prices of the following 14 representative products during 5-year base period 1935-39. Structural shapes, plates, rails, hot-rolled and cold-finished bars, pipe, wire, nails, tin plate, hot and cold-rolled sheets, galvanized sheets, hot and cold-rolled strip. For complete explanation see STEEL, Sept. 19, 1949, p. 54.

Arithmetical steel price composite based on same products as the weighted finished steel index with the exception of rails, cold-finished bars, galvanized sheets and hot-rolled strip.

Basic and No. 2 foundry pig iron composites are based on average prices at Pittsburgh, Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Granite City, Youngstown. Malleable composite based on same points, except Birmingham.

Steelmaking scrap composite based on average prices of No. 1 heavy melting steel at Pittsburgh, Chicago and Philadelphia.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED MATERIALS

	Sept. 7 1950	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh....	3.45	3.45	3.45	3.35	2.25
Bars, H.R., Chicago	3.45	3.45	3.45	3.35	2.25
Bars, H.R., del. Philadelphia	3.93	3.93	3.93	3.83	2.57
Bars, C.F., Pittsburgh	4.10–15	4.10–15	4.10–15	3.95–4.00	2.75
Shapes, Std., Pittsburgh ..	3.40	3.40	3.40	3.25	2.10
Shapes, Std., Chicago	3.40	3.40	3.40	3.25	2.10
Shapes, del. Philadelphia..	3.46	3.46	3.42	3.50	2.215
Plates, Pittsburgh	3.50	3.50	3.50	3.40	2.25
Plates, Chicago	3.50	3.50	3.50	3.40	2.25
Plates, Coatesville, Pa. ..	3.90	3.90	3.60	3.50	2.25
Plates, Sparrows Point, Md.	3.50	3.50	3.50	3.40	2.25
Plates, Claymont, Del. ...	3.90	3.90	3.60	3.50	2.25
Plates, del. Philadelphia ..	3.84	3.84	3.69	3.59	2.30
Sheets, H.R., Pittsburgh..	3.35	3.35	3.35	3.25	2.20
Sheets, H.R., Chicago	3.35	3.35	3.35	3.25	2.20
Sheets, C.R., Pittsburgh ..	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Chicago	4.10	4.10	4.10	4.00	3.05
Sheets, C.R., Detroit	4.30	4.30	4.30	4.20	3.15
Sheets, Galv., Pittsburgh..	4.40	4.40	4.40	4.40	3.70
Strip, H.R., Pittsburgh ..	3.50	3.50	3.50	3.25	2.10
Strip, H.R., Chicago	3.25	3.25	3.25	3.25	2.10
Strip, C.R., Pittsburgh ...	4.15–50	4.15–50	4.15–50	4.00–50	2.80
Strip, C.R., Chicago	4.30	4.30	4.30	4.00–15	2.90
Strip, C.R., Detroit	4.35–95	4.35–95	4.35–95	4.20–25	2.90
Wire, Basic, Pittsburgh ..	4.50	4.50	4.50	4.15	2.75
Nails, Wire, Pittsburgh ...	5.30	5.30	5.30	5.15	2.90
Tin plate, box, Pittsburgh.	$7.50	$7.50	$7.50	$7.75	$5.00

SEMIFINISHED

Billets, forging, Pitts.(NT)	$63.00	$63.00	$63.00	$61.00	$42.00
Sheet bar, mill (NT)	58.00	58.00	58.00	60.00	36.00
Wire rods, $\frac{7}{32}$-$\frac{9}{16}$", Pitts...	3.85	3.85	3.85	3.40	2.15

PIG IRON, Gross Ton

Bessemer, Pitts.	$47-$50	$47-$50	$47-$50	$47.00	$25.50
Basic, Valley	46.00	46.00	46.00	46.00	24.50
Basic, del. Phila.	50.39	50.39	50.39	49.44	26.34
No. 2 Fdry, Pitts.	49.50	49.50	49.50	46.50	25.00
No. 2 Fdry, Chicago	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, Valley	46.50	46.50	46.50	46.50	25.00
No. 2 Fdry, del. Phila. ...	50.89	50.89	50.89	49.94	26.84
No. 2 Fdry, Birm.	42.38	42.38	42.38	39.38	21.38
No. 2 Fdry (Birm.) del. Cin.	49.08	49.08	49.08	45.43	25.06
Malleable, Valley	46.50	46.50	46.50	46.50	25.00
Malleable, Chicago	46.50	46.50	46.50	46.50	25.00
Charcoal, Lyles, Tenn. ...	60.00	60.00	60.00	66.00	33.00
Ferromanganese, Etna, Pa.	175.00	175.00	175.00	175.00	140.33*

* Delivered, Pittsburgh.

SCRAP, Gross Ton

No. 1 Heavy Melt. Pitts..	$44.00	$44.00	$41.00	$27.00	$20.00
No. 1 Heavy Melt. E. Pa. .	39.25	38.50	36.75	24.00	18.75
No. 1 Heavy Melt, Chicago	40.00	40.25	38.00	24.50	18.75
No. 1 Heavy Melt. Valley..	43.75	43.75	42.25	26.50	20.00
No. 1 Heavy Melt. Cleve. .	41.25	41.75	40.75	23.00	19.50
No. 1 Heavy Melt. Buffalo.	39.75	39.75	36.75	26.25	19.25
Rails, Rerolling, Chicago..	59.50	59.50	55.125	38.50	22.25
No. 1 Cast, Chicago	49.50	49.50	49.00	40.50	20.00

Coke, Net Ton

Beehive, Furn., Connlsvl...	$14.25	$14.25	$14.25	$13.25	$7.50
Beehive, Fdry., Connlsvl...	15.50	15.50	15.50	15.75	8.25
Oven Fdry., Chicago	21.00	21.00	21.00	20.00	13.35

NONFERROUS METALS

Copper, del. Conn.	22.50-24.50	22.50-24.50	22.50	17.625	12.00
Zinc, E. St. Louis	15.00	15.00	15.00	10.00	8.25
Lead, St. Louis	14.80	13.80	11.80	14.925	6.35
Tin, New York	99.00	98.50	103.50	103.50	52.00
Aluminum, del.	17.50	17.50	17.50	17.00	15.00
Antimony, Laredo, Tex. ..	28.50	24.50	24.50	38.50	14.50
Nickel, refinery, duty paid.	48.00	48.00	48.00	40.00	35.00

Pig Iron

For key to producing companies, turn next page.
Minimum delivered prices do not include 3% federal tax.

PIG IRON, Gross Ton

	Basic	No. 2 Foundry	Malleable	Bessemer
Bethlehem, Pa. B2	$48.00	$48.50	$49.00	$49.50
Brooklyn, N.Y., del.	....	52.79	53.29	....
Newark, del.	50.63	51.13	51.63	52.13
Philadelphia, del.	50.39	50.89	51.39	51.89
Birmingham District				
Alabama City, Ala. R2	41.88	42.38	....	....
Birmingham R2	41.88	42.38	....	....
Birmingham S9	41.88	42.38	....	....
Woodward, Ala. W15	41.88	42.38	....	....
Cincinnati, del.	....	49.08	....	....
Buffalo District				
Buffalo H1, R2	46.00	46.50	47.00	....
Tonawanda, N.Y., W12	46.00	46.50	47.00	....
N. Tonawanda, N.Y., T9	....	46.50	47.00	....
Boston, del.	55.26	55.76	56.20	....
Rochester, N.Y., del.	48.63	49.13	49.63	....
Syracuse, N.Y., del.	49.58	50.08	50.58	....
Chicago District				
Chicago I-3	46.00	46.50	46.50	47.00
Gary, Ind. C3	46.00	....	46.50	....
Indiana Harbor, Ind. I-2	46.00	....	46.50	....
So. Chicago, Ill. W14, Y1	46.00	46.50	46.50	....
So. Chicago, Ill. C3	46.00	....	46.50	47.00
Milwaukee, del.	47.89	48.39	48.39	48.89
Muskegon, Mich., del.	....	51.98	51.98	....
Cleveland District				
Cleveland A7	46.00	46.50	46.50	47.00
Cleveland R2	46.00	46.50	46.50	....
Akron, del. from Cleve.	48.39	48.89	48.89	49.39
Lorain, O. N3	46.00	....	....	47.00
Duluth I-3	....	....	46.50	....
Erie, Pa. I-3	46.00	46.50	46.50	47.00
Everett, Mass. E1	....	50.50	51.00	....
Fontana, Calif. K1	52.00	52.50	....	....
Geneva, Utah G1	46.00	46.50	....	....
Seattle, Tacoma, Wash., del.	....	54.20	....	....
Portland, Oreg., del.	....	54.20	....	....
Los Angeles, San Francisco, del.	53.70	54.20	....	....
Granite City, Ill. M10	47.90	48.40	48.90	....
St. Louis, del. (inc. tax)	48.65	49.15	49.65	....
Ironton, Utah C11	46.00	46.50	....	....
Lone Star, Tex. L6	41.50	*42.00	42.00	....
Minnequa, Colo. C10	47.00	47.50	47.50	....
Pittsburgh District				
Neville Island, Pa. P6	....	49.50	49.50	50.00
Pitts., N.&S. sides, Ambridge, Aliquippa, del.	....	50.69	50.69	51.19
McKees Rocks, del.	....	50.45	50.45	50.95
Lawrenceville, Homestead, McKeesport, Monaca, del.	....	50.94	50.94	51.44
Verona, del.	....	51.40	51.40	51.90
Brackenridge, del.	....	51.63	51.63	52.13
Bessemer Pa. C3	46.00	....	46.50	47.00
Clairton, Rankin, So. Duquesne, Pa. C3	46.00	....	....	....
McKeesport, Pa. N3	46.00	....	....	47.00
Sharpsville, Pa. S6	....	....	46.50	47.00
Steelton, Pa. B2	48.00	48.50	49.00	49.50
Steubenville, O. W10	46.00	....	....	....
Sweedland, Pa. A3	50.00	50.50	51.00	51.50
Toledo, O. I-3	46.00	46.50	46.50	47.00
Cincinnati, del.	51.01	51.51	....	....
Troy, N.Y., R2	48.00	48.50	49.00	49.50
Youngstown District				
Hubbard, O. Y1	46.00	46.50	46.50	....
Youngstown C3	46.00	....	....	47.00
Youngstown Y1	46.00	46.50	46.50	47.00
Mansfield, O., del.	50.26	50.76	50.76	51.26

* Low phos, southern grade.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si over base grade, 1.75-2.25%.

Phosphorus: Deduct 38 cents per ton for P content of 0.70% and over.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1%, or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, incl., add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.5% Si to 11.50%)

Jackson, O. G2, J1	$57.00
Buffalo H1	58.25

ELECTRIC FURNACE SILVERY PIG IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.5% Mn over 1%; $1 for 0.045% max. P)

Niagara Falls, N.Y. P15	$78.00
Keokuk, Iowa, Openhearth & Fdry, frt. allowed K2	77.00
Keokuk, Iowa, OH & Fdry., 12½ lb. piglets, frt. allowed K2 ...	82.00
Wenatchee, Wash., OH & Fdry., frt. allowed K2	77.00

CHARCOAL PIG IRON, Gross Ton

(Low phos, semi-cold blast; differential charged for silicon over base grade; also for hard chilling iron Nos. 5 & 6)

Lyles, Tenn. T3	$60.00

LOW PHOSPHOROUS PIG IRON, Gross Ton

Cleveland, intermediate, A7	$51.00
Steelton, Pa. B2	54.00
Philadelphia delivered	57.00
Troy, N.Y. R2	54.00

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Semifinished and Finished Steel Products

Mill prices as reported to STEEL Sept. 7, 1950; cents per pound except as otherwise noted. Changes shown in italics. Code numbers following mill points indicate producing company; key on next two pages.

INGOTS, Carbon, Forging (NT)
Detroit R7 ..... $50.00
Fontana,Calif. K1 .... 76.00
Munhall,Pa. C3 ..... 50.00

INGOTS, Alloy (NT)
Detroit R7 ..... $51.00
Fontana,Calif. K1 .... 77.00
Houston,Tex. S5 ..... 59.00
Midland,Pa. C18 ..... 51.00
Munhall,Pa. C3 ..... 51.00
So.Duquesne,Pa. C3 .. 51.00

BILLETS, BLOOMS & Slabs Carbon, Rerolling (NT)
Bessemer,Pa. C3 .... $53.00
Clairton,Pa. C3 ..... 53.00
Conshohocken,Pa. A3 .. 62.00
Ensley,Ala. T2 ..... 53.00
Fairfield,Ala. T2 ..... 53.00
Fontana,Calif. K1 .... 72.00
Gary,Ind. C3 ..... 53.00
Johnstown,Pa. B2 .... 53.00
Lackawanna,N.Y. B2.. 53.00
Munhal.,Pa. C3 ..... 53.00
So.Chicago,Ill. C3 ... 53.00
So.Duquesne,Pa. C3 ... 53.00

Carbon, Forging (NT)
Bessemer,Pa. C3 ..... $63.00
Buffalo R2 ..... 63.00
Canton,O. R2 ..... 63.00
Clairton,Pa. C3 ..... 63.00
Cleveland R2 ..... 63.00
Conshohocken,Pa. A3... 68.00
Detroit R7 ..... 66.00
Ensley,Ala. T2 ..... 63.00
Fairfield,Ala. T2 ..... 63.00
Fontana,Calif. K1 ... 82.00
Gary,Ind. C3 ..... 63.00
Geneva,Utah G1 ..... 63.00
Houston,Tex. S5 ..... 71.00
Ind.Harbor,Ind. I-2 ... 63.00
Johnstown,Pa. B2 .... 63.00
Lackawanna,N.Y. B2... 63.00
LosAngeles B3 ..... 82.00
Munhall,Pa. C3 ..... 63.00
Seattle B3 ..... 82.00
So.Chicago C3,R2,W14 . 63.00
So.Duquesne,Pa. C3 .. 63.00
So.SanFrancisco B3 ... 82.00

Alloy (NT)
Bethlehem,Pa. B2 .... $66.00
Buffalo R2 ..... 66.00
Canton,O. R2, T7 .... 66.00
Conshohocken,Pa. A3.. 70.00
Detroit R7 ..... 66.00
Fontana,Calif. K1 .... 85.00
Gary,Ind. C3 ..... 66.00
Houston,Tex. S5 ..... 74.00
Ind.Harbor,Ind. Y1 ... 66.00
Johnstown,Pa. B2 .... 66.00
Lackawanna,N.Y. B2.. 66.00
LosAngeles B3 ..... 86.00
Massillon,O. R2 ..... 66.00
Midland,Pa. C18 ..... 66.00
Munhall,Pa. C3 ..... 66.00
Sharon,Pa. S3 ..... 66.00
So.Chicago C3,R2,W14 . 66.00
So.Duquesne,Pa. C3 .. 66.00
Warren,O. C17 ..... 66.00
Youngstown Y1 ..... 66.00

ROUNDS, SEAMLESS TUBE (NT)
Canton,O. R2 ..... $76.00
Cleveland R2 ..... 76.00
Fontana,Calif. K1 .... 100.00
Gary,Ind. C3 ..... 76.00
Ind.Harbor,Ind. I-2 ... 76.00
Massillon,O. R2 ..... 76.00
So.Chicago,Ill. R2 .... 76.00
So.Duquesne,Pa. C3 ... 76.00

SHEETS BARS (NT)
Fontana,Calif. K1 .... $86.00

SKELP
Aliquippa,Pa. J5 ..... 3.25
Munhall,Pa. C3 ..... 3.15
Warren,O. R2 ..... 3.15
Youngstown C3, R2 .... 3.15

WIRE RODS
AlabamaCity,Ala. R2 .. 3.85
Buffalo W12 ..... 3.85
Cleveland A7 ..... 3.85
Donora,Pa. A7 ..... 3.85
Fairfield,Ala. T2 ..... 3.85
Fontana,Calif. K1 .... 4.60
Houston,Tex. S5 ..... 4.25
Ind.Harbor,Ind. Y1 ... 3.85
Johnstown,Pa. B2 .... 3.85
Joliet,Ill. A7 ..... 3.85
LosAngeles B3 ..... 4.65
Minnequa,Colo. C10 .... 4.10
Monessen,Pa. P7 ..... 3.85
No.Tonawanda,N.Y. B11. 3.85
Pittsburg,Calif. C11 ... 4.50
Portsmouth,O. P12 .... 3.85
Roebling,N.J. R5 ..... 3.95
So.Chicago,Ill. R2 .... 3.85
SparrowsPoint,Md. B2.. 3.95
Sterling,Ill.(1) N15 .... 3.85
Struthers,O. Y1 ..... 3.85
Torrance,Calif. C11 ... 4.65
Worcester A7 ..... 4.15

STRUCTURALS

Carbon Steel Stand. Shapes
AlabamaCity,Ala. R2 .. 3.40
Aliquippa,Pa. J5 ..... 3.40
Bessemer,Ala. T2 ..... 3.40
Bethlehem,Pa. B2 ..... 3.45
Clairton,Pa. C3 ..... 3.40
Fairfield,Ala. T2 ..... 3.40
Fontana,Calif. K1 .... 4.00
Gary,Ind. C3 ..... 3.40
Geneva,Utah G1 ..... 3.40
Houston,Tex. S5 ..... 3.80
Ind.Harbor,Ind. I-2 .... 3.40
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.00
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.00
Minnequa,Colo. C10 ... 3.75
Munhall,Pa. C3 ..... 3.40
Niles,Calif.(22) P1 .... 4.02
Phoenixville,Pa. P4 .... 4.25
Portland,Oreg. O4 .... 4.05
Seattle B3 ..... 4.05
So.Chicago,Ill. C3, W14. 3.40
So.SanFrancisco B3 .... 3.95
Torrance,Calif. C11 .... 4.00
Weirton,W.Va. W6 .... 3.40

Alloy Stand. Shapes
Clairton,Pa. C3 ..... 4.05
Fontana,Calif. K1 .... 5.25
Munhall,Pa. C3 ..... 4.05
So.Chicago,Ill. C3 .... 4.05

H.S., L.A. Stand. Shapes
Aliquippa,Pa. J5 ..... 5.15
Bessemer,Ala. T2 ..... 5.15
Bethlehem,Pa.(14) B2.. 5.20
Clairton,Pa. C3 ..... 5.15
Fairfield,Ala. T2 ..... 5.15
Fontana,Calif. K1 .... 5.75
Gary,Ind. C3 ..... 5.15
Geneva,Utah G1 ..... 5.10
Ind.Harbor,Ind. I-2, Y1. 5.15
Johnstown,Pa. B2 .... 5.20
Lackawanna,N.Y.(14)B2 5.20
LosAngeles B3 ..... 5.75
Munhall,Pa. C3 ..... 5.15
So.Chicago,Ill. C3 ..... 5.15
So.SanFrancisco B3 .... 5.70
Struthers,O. Y1 ..... 5.15

Wide Flange
Bethlehem,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Munhal:,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 .... 3.40

H.S., L.A. Wide Flange
Bethlehem,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 .. 5.20
Munhall,Pa. C3 ..... 5.10
So.Chicago,Ill. C3 .... 5.10

SHEET STEEL PILING
Ind.Harbor,Ind. I-2 .... 4.20
Lackawanna,N.Y. B2 .. 4.20
Munhall,Pa. C3 ..... 4.20
So.Chicago,Ill. C3 .... 4.20
Weirton,W.Va. W6 .... 4.20

BEARING PILES
Munhall,Pa. C3 ..... 3.40
So.Chicago,Ill. C3 .... 3.40

PLATES,High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.35
Bessemer,Ala. T2 .... 5.35
Clairton,Pa. C3 ..... 5.35
Cleveland J5, R2 .... 5.35
Conshohocken,Pa. A3 .. 5.35
Ecorse,Mich. G5 ..... 5.60
Fairfield,Ala. T2 ..... 5.35
Fontana,Calif. K1 .... 5.95
Gary,Ind. C3 ..... 5.35
Geneva,Utah G1 ..... 5.35
Ind.Harbor,Ind. I-2, Y1. 5.35
Johnstown,Pa. B2 ..... 5.35
Munhall,Pa. C3 ..... 5.35
Pittsburgh J5 ..... 5.35
Sharon,Pa. S3 ..... 5.35
So.Chicago,Ill. C3 .... 5.35
SparrowsPoint,Md. B2.. 5.35
Warren,O. R2 ..... 5.35
Youngstown Y1 ..... 5.35

PLATES, Open-Hearth Alloy
Claymont,Del. W16 .... 4.50
Coatesville,Pa. L7 .... 4.80
Conshohocken,Pa. A3 .... 4.55
Fontana,Calif. K1 .... 5.40
Gary,Ind. C3 ..... 4.40
Johnstown,Pa. B2 .... 4.40
Munhall,Pa. C3 ..... 4.40
Sharon,Pa. S3 ..... 4.40
So.Chicago,Ill. C3 .... 4.40
SparrowsPoint,Md. B2 .. 4.40

FLOOR PLATES
Cleveland J5 ..... 4.55
Conshohocken,Pa. A3 .. 4.55
Harrisburg,Pa. C5 .... 5.25
Ind.Harbor,Ind. I-2 .... 4.55
Munhall,Pa. C3 ..... 4.55
So.Chicago,Ill. C3 .... 4.55

PLATES (Universal Mill)
Fontana,Calif. K1 .... 4.40

PLATES, Carbon A.R.
Fontana,Calif. K1 .... 5.25

PLATES, Carbon Steel
AlabamaCity,Ala. R2 .. 3.50
Aliquippa,Pa. J5 ..... 3.50
Ashland,Ky.(15) A10 .. 3.50
Bessemer,Ala. T2 .... 3.50
Clairton,Pa. C3 ..... 3.50
C.aymont,Del. W16 .... 3.90
Cleveland J5 R2 ..... 3.50
Coatesville,Pa. L7 .... 3.90
Conshohocken,Pa. A3 .. 3.75
Ecorse,Mich. G5 ..... 3.75
Fairfield,Ala. T2 ..... 3.50
Fontana,Calif. K1 .... 4.10
Gary,Ind. C3 ..... 3.50
Geneva,Utah G1 ..... 3.50
Harrisburg,Pa. C5 .... 4.25
Houston,Tex. S5 ..... 3.90
Ind.Harbor,Ind. I-2, Y1.. 3.50
Johnstown,Pa. B2 .... 3.50
Lackawanna,N.Y. B2 .. 3.50
Minnequa,Colo. C10 .... 4.30
Munhall,Pa. C3 ..... 3.50
Pittsburgh J5 ..... 3.50
Seattle B3 ..... 4.40
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. C3, W14. 3.50
SparrowsPoint,Md. B2 .. 3.50
Steubenville,O. W10 .... 3.50
Warren,O. R2 ..... 3.50
Weirton,W.Va. W6 .... 3.50
Youngstown C3, R2, Y1. 3.50

PLATES, Wrought Iron
Economy,Pa. B14 .... 7.85

PLATES, Ingot Iron
Ashland,c.l.(15) A10 ... 3.75
Ashland,lcl(15) A10 .... 4.25
Cleveland,cl R2 ..... 4.10
Warren,O.cl R2 ..... 4.10

BARS, Hot-Rolled Carbon
AlabamaCity,Ala. R2 .. 3.45
Aliquippa,Pa. J5 ..... 3.45
Alton,Ill(1) L1 ..... 3.45
Atlanta,Ga. A11 ..... 3.60
Bessemer,Ala. T2 ..... 3.45
Buffa.o R2 ..... 3.45
Canton,O. R2 ..... 3.45
Clairton,Pa. C3 ..... 3.45
Cleveland R2 ..... 3.45
Ecorse,Mich. G5 ..... 3.65
Emeryville,Calif. J7 .... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 .... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1. 3.45
Johnstown,Pa. B2 ..... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 3.85
Niles,Calif. P1 ..... 4.17
N.Tonawanda,N.Y. B11. 3.45
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 .... 4.20
Seattle B3, N14 ..... 4.20
So.Chicago C3, R2, W14. 3.45
So.Duquesne,Pa. C3 .... 3.45
S.SanFran.,Cal. B3 .... 4.20
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Weirton,W.Va. W6 .... 3.45
Youngstown C3, R2 .... 3.45

BAR SIZE ANGLES; S. SHAPES
Aliquippa,Pa. J5 ..... 3.45
Atlanta A11 ..... 3.60
Johnstown,Pa. B2 ..... 3.45
Lackawanna,N.Y. B2 .. 3.45
Niles,Calif. P1 ..... 4.17
Pittsburgh(23) J5 .... 3.45
Portland,Oreg. O4 .... 4.20
SanFrancisco S7 ..... 4.00
Weirton,W.Va. W6 .... 3.45

BAR SIZE ANGLES; H.R.CARBON
Bethlehem,Pa. B2 ..... 3.65

BARS, Hot-Rolled Alloy
Bethlehem,Pa. B2 ..... 3.95
Buffalo R2 ..... 3.95
Canton,O. R2, T7 ..... 3.95
Clairton,Pa. C3 ..... 3.95
Ecorse,Mich. G5 ..... 4.25
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 3.95
Houston,Tex. S5 ..... 4.35
Ind.Harbor,Ind. I-2, Y1. 3.95
Johnstown,Pa. B2 ..... 3.95
KansasCity,Mo. S5 .... 4.55
Lackawanna,N.Y. B2 .. 3.95
LosAngeles B3 ..... 5.00
Massillon,O. R2 ..... 3.95
Midland,Pa. C18 ..... 3.95
So.Chicago C3, R2, W14. 3.95
So.Duquesne,Pa. C3 .. 3.95
Struthers,O. Y1 ..... 3.95
Warren,O. C17 ..... 3.95
Youngstown C3 ..... 3.95

BAR SHAPES, Hot-Rolled Alloy
Clairton,Pa. C3 ..... 4.20
Fontana,Calif. K1 ..... 4.95
Gary,Ind. C3 ..... 4.20
Youngstown C3 ..... 4.20

BARS & SMALL SHAPES, H.R., High-Strength Low-Alloy
Aliquippa,Pa. J5 ..... 5.20
Atlanta A11 ..... 5.35
Bessemer,Ala. T2 .... 5.20
Bethlehem,Pa. B2 .... 5.20
Clairton,Pa. C3 ..... 5.20
Cleveland R2 ..... 5.20
Ecorse,Mich. G5 ..... 5.40
Fairfield,Ala. T2 ..... 5.20
Fontana,Calif. K1 .... 6.25
Gary,Ind. C3 ..... 5.20
Ind.Harbor,Ind. I-2, Y1. 5.20
Johnstown,Pa. B2 ..... 5.20
Lackawanna,N.Y. B2 .. 5.20
LosAngeles B3 ..... 5.90
Pittsburgh J5 ..... 5.20
So.Duquesne,Pa. C3 .... 5.20
So.SanFrancisco B3 .... 5.95
Struthers,O. Y1 ..... 5.20
Youngstown C3 ..... 5.20

BARS, Cold-Finished Carbon
Aliquippa,Pa. K5 ..... 4.15
Ambridge,Pa. W18 .... 4.15
BeaverFalls,Pa. M12,R2. 4.15
Buffalo B5 ..... 4.15
Camden,N.J. P13 ..... 4.60
Carnegie,Pa. C12 ..... 4.15
Chicago W18 ..... 4.15
C.eveland A7, C20 .... 4.15
Detroit P17 ..... 4.30
Donora,Pa. A7 ..... 4.15
Ecorse,Mich. G5 ..... 4.35
Elyria,O. W8 ..... 4.15
FranklinPark,Ill. N5 ... 4.15
Gary,Ind. R2 ..... 4.15
Hammond,Ind. L2, M13. 4.15
Hartford,Conn. R2 .... 4.55
Harvey,Ill. B5 ..... 4.15
LosAngeles R2 ..... 5.55
Mansfield,Mass. B5 .... 4.55
Massillon,O. R2, R8 .... 4.15
Midland,Pa. C18 ..... 4.15
Monaca,Pa. S17 ..... 4.15
Newark,N.J. W18 ..... 4.55
Plymouth,Mich. P5 .... 4.40
Pittsburgh J5 ..... 4.10
Putnam,Conn. W18 .... 4.55
Readville,Mass. C14 .... 4.55
St.Louis,Mo. M5 ..... 4.55
So.Chicago,Ill. W14 .... 4.15
SpringCity,Pa.(5) K3 .. 4.55
Struthers,O. Y1 ..... 4.15
Waukegan,I l. A7 ..... 4.15
Youngstown F3, Y1 .... 4.15

BARS, Cold-Finished Alloy
Aliquippa,Pa. K5 .... 4.90
Ambridge,Pa. W18 .... 4.90
BeaverFalls,Pa. M12 .... 4.90
Bethlehem,Pa. B2 .... 4.90
Buffalo B5 ..... 4.90
Canton,O. R2, T7 ..... 4.90
Carnegie,Pa. C12 .... 4.90
Chicago W18 ..... 4.90
Cleveland A7, C20 .... 4.90
Detroit P17 ..... 5.05
Donora,Pa. A7 ..... 4.90
Elyria,O. W8 ..... 4.90
Gary,Ind. R2 ..... 4.90
Hammond,Ind. L2, M13. 4.90
Hartford,Conn. R2 .... 5.20
Harvey,Ill. B5 ..... 4.90
Lackawanna,N.Y. B2 .. 4.90
Mansfield,Mass. B5 .... 5.20
Massillon,O. R2, R8 .... 4.90
Midland,Pa. C18 ..... 4.90
Monaca,Pa. S17 ..... 4.90
Newark,N.J. W18 ..... 5.20
Plymouth,Mich. P5 .... 5.10
So.Chicago,I.l. R2, W14. 4.90
Struthers,O. Y1 ..... 4.90
Warren,O. C17 ..... 4.90
Waukegan,Ill. A7 ..... 4.90
Worcester,Mass. A7 .... 5.20
Youngstown F3, Y1 .... 4.90

RAIL STEEL BARS
ChicagoHts.(3,4)C2,I-2 .3.45
Dallas,Tex(4) S20 .... 6.00
Franklin,Pa.(3, 4) F5.. 3.70
FortWorth,Tex.(26) T4.. 4.33
Huntngtn,W.Va.(3) W7. 4.00
Marion,O(3) P11 ..... 3.70
Moline,Ill.(3) R2 ..... 3.55
Williamsport(3) S19 .... 4.25

BARS, Wrought Iron
Economy,Pa.(S.R.) B14. 8.60
Economy,Pa.(D.R.)B14 11.00
Economy(Staybolt)B14 11.30
Dover,N.J.(Staybolt)U1 15.00
Dover(Eng.Bolt) U1 ..13.50
Dover(Wrgt.Iron) U1 ..12.25
Mck.Rks.(S.R.) L5 .... 8.60
McK.Rks.(D.R.) L5 ..11.25
Mck.Rks.(Staybolt) L5. 12.75

BARS, Reinforcing (Fabricators)
AlabamaCity,Ala. R2 ... 3.45
Alton,Ill.(6) L1 ..... 3.45
Atlanta A11 ..... 3.60
Buffalo R2 ..... 3.45
Cleveland R2 ..... 3.45
Emeryville,Calif. J7 .... 4.20
Fairfield,Ala. T2 ..... 3.45
Fontana,Calif. K1 .... 4.10
Gary,Ind. C3 ..... 3.45
Houston,Tex. S5 ..... 3.85
Ind.Harbor,Ind. I-2, Y1. 3.45
Johnstown,Pa. B2 .... 3.45
KansasCity,Mo. S5 .... 4.05
Lackawanna,N.Y. B2 .. 3.45
LosAngeles B3 ..... 4.15
Milton,Pa. B6 ..... 3.45
Minnequa,Colo. C10 .... 4.25
Niles,Calif. P1 ..... 4.17
Pittsburg,Calif. C11 .... 4.15
Pittsburgh J5 ..... 3.45
Portland,Oreg. O4 .... 4.20
SandSprings,Okla. S5 .. 4.35
Seattle B3, N14 ..... 4.20
So.Chicago,Ill. R2 .... 3.45
So.Duquesne,Pa. C3 .... 3.45
So.SanFrancisco B3 .... 4.20
SparrowsPoint,Md. B2 .. 3.45
Struthers,O. Y1 ..... 3.45
Torrance,Calif. C11 .... 4.15
Youngstown C3, R2 .... 3.45

BARS, Reinforcing
(Fabricated; to Consumers)
Huntington,W.Va. W7 .. 4.50
Johnstown, ¼-1" B2 ... 4.35
LosAngeles B3 ..... 5.00
Marion,O. P11 ..... 4.50
Seattle B3, N14 ..... 5.10
So.SanFrancisco B3 .... 5.00
SparrowsPt., ¼-1" B2 .. 4.35
Williamsport,Pa. S19 .. 4.35

SHEETS, Hot-Rolled Steel (18 gage and heavier)
AlabamaCity,Ala. R2 .. 3.35
Ashland,Ky.(8) A10 ... 3.35
Butler,Pa. A10 ..... 3.35
Cleveland J5, R2 .... 3.35
Conshohocken,Pa. A3 ... 3.60
Detroit M1 ..... 4.15
Ecorse,Mich.(8) G5 .... 3.55
Fairfield,Ala. T2 ..... 3.35
Fontana,Calif. K1 .... 4.25
Gary,Ind. C3 ..... 3.35
Geneva,Utah G1 ..... 3.45
Ind.Harbor,Ind. I-2, Y1. 3.35
Irvin,Pa. C3 ..... 3.35
Lackawanna,N.Y. B2 .. 3.35
Munhall,Pa. C3 ..... 3.35
Pittsburg,Calif. C11 .... 4.05
Pittsburgh J5 ..... 3.35
Sharon,Pa. S3 ..... 3.50
So.Chicago,Ill. W14 .... 3.35
SparrowsPoint,Md. B2 .. 3.35
Steubenville,O. W10 .... 3.35
Torrance,Ca.if. C11 .... 4.05
Warren,O. R2 ..... 3.35
Weirton,W.Va. W6 .... 3.35
Youngstown C3, Y1 .... 3.35

SHEETS, Hot-Rolled Carbon Steel (19 gage and lighter)
AlabamaCity,Ala. R2 .. 4.50
Dover,O. R1 ..... 4.65
Ind.Harbor,Ind. I-2 .... 4.40
Mansfield,O. E6 ..... 4.15
Niles,O. N12 ..... 4.10
Torrance,Calif. C11 .... 5.15

SHEETS, H-R (14 ga., heavier) High-strength Low-Alloy
Cleveland J5, R2 .... 5.05
Conshohocken,Pa. A3 .. 5.05
Ecorse,Mich. G5 ..... 5.25
Fairfield,Ala. T2 ..... 5.05
Fontana,Calif. K1 .... 6.74
Gary,Ind. C3 ..... 5.05
Ind.Harbor,Ind. I-2, Y1. 5.05
Irvin,Pa. C3 ..... 5.05
Lackawanna(35) B2 .. 5.05
Pittsburgh J5 ..... 5.05
Sharon,Pa. S3 ..... 5.05
So.Chicago,Ill. C3 .... 5.05
SparrowsPoint(36) B2 .. 5.05
Warren,O. R2 ..... 5.05
Weirton,W.Va. W6 .... 5.05
Youngstown, C3, Y1 ... 5.05

SHEETS, Cold-Rolled High-Strength Low-Alloy
Cleveland J5, R2 .... 6.20
Ecorse,Mich. G5 ..... 6.40
Fontana,Calif. K1 .... 7.05
Gary,Ind. C3 ..... 6.20
Ind.Harbor,Ind. I-2, Y1. 6.20
Irvin,Pa. C3 ..... 6.20
Lackawanna(37) B2 .... 6.20
Pittsburgh J5 ..... 6.20
SparrowsPoint(38) B2.. 6.20
Warren,O. R2 ..... 6.20
Weirton,W.Va. W6 .... 6.20
Youngstown Y1 ..... 6.20

SHEETS, Cold-Rolled Steel (Commercial Quality)

Butler,Pa. A10	4.10
Cleveland J5, R2	4.10
Ecorse,Mich. G5	4.30
Fairfield,Ala. T2	4.10
Follansbee,W.Va F4	5.10
Fontana,Calif. K1	5.00
Gary,Ind. C3	4.10
GraniteCity,Ill. G4	4.30
Ind.Harbor,Ind. I-2, Y1	4.10
Irvin,Pa. C3	4.10
Lackawanna,N.Y. B2	4.10
Middletown,O. A10	4.10
Pittsburg,Calif. C11	5.05
Pittsburgh J5	4.10
SparrowsPoint,Md. B2	4.10
Steubenville,O. W10	4.10
Warren,O. R2	4.10
Weirton,W.Va. W6	4.10
Youngstown Y1	4.10

SHEETS, Galv'd No. 10 Steel

AlabamaCity,Ala. R2	4.40
Ashland,Ky. (8) A10	4.40
Canton,O. R2	4.40
Delphos,O. N16	5.40
Dover,O. R1	4.75
Fairfield,Ala. T2	4.40
Gary,Ind. C3	4.40
GraniteCity,Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Kokomo, Ind. C16	4.50
MartinsFerry,O. W10	4.40
Niles,O. N12	4.65
Pittsburg,Calif. C11	5.15
SparrowsPoint,Md. B2	4.40
Steubenville,O. W10	4.40
Torrance,Calif. C11	5.15
Weirton,W.Va. W6	4.40

SHEETS, Galvanized No. 10, High-Strength Low Alloy

Irvin,Pa. C3	6.75
SparrowsPoint(39) B2	6.75

SHEETS, Galvannealed Steel

Canton,O. R2	4.95
Irvin,Pa. C3	4.95
Kokomo,Ind. C16	5.05
Niles,O. N12	5.20

SHEETS, ZINCGRIP Steel No. 10

Butler,Pa. A10	4.65
Middletown,O. A10	4.65

SHEETS, Electro Galvanized

Cleveland R2 (28)	5.25
Niles,O. R2 (28)	5.25
Weirton,W.Va. W6	5.10

SHEETS, Zinc Alloy

Ind.Harbor,Ind. I-2	5.05

SHEETS, Long Terne, Steel (Commercial Quality)

BeechBottom,W.Va. W10	4.80
Gary,Ind. C3	4.80
Mansfield,O. E6	4.80
Middletown,O. A10	4.80
Niles,O. N12	4.80
Weirton,W.Va. W6	4.80

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10	5.20

ROOFING SHORT TERNES (Package; 8 lb coated)

Gary,Ind. C3	$17.50
Yorkville,O. W10	17.50

MANUFACTURING TERNES (Special Coated)

Fairfield,Ala. T2	$6.45
Gary,Ind. C3	6.35
Irvin, Pa. C3	6.35
SparrowsPoint,Md. B2	6.45
Yorkville,O. W10	6.35

SHEETS, Lt. Coated Ternes, 6 lb

Yorkville,O. W10	$7.05

SHEETS, Mfg. Ternes, 8 lb

Gary,Ind. C3	$8.10
Warren,O. R2	8.10
Yorkville,O. W10	8.10

BLUED STOCK, 29 Ga.

Yorkville,O. W10	6.00

SHEETS, Culvert No. 16

	Cu Alloy	Cu Fe
Ashland A10	5.20	...
Canton,O. R2	5.25	5.70
Fairfield,Ala. T2	5.20	5.45
Gary C3	5.20	5.45
IndianaHarbor I-2	5.20	5.45
Irvin,Pa. C3	5.20	5.45
Kokomo C16	5.40	...
MartinsFy,O. W10	5.20	5.45
Pittsburg,Cal. C11	5.95	...
SparrowsPt. B2	5.20	...
Torrance, Cal. C11	5.95	...

SHEETS, Culvert, No. 16 Corrugated Ingot Iron

Ashland,Ky. A10	5.45
Fairfield,Ala. T2	5.45

SHEETS, Hot-Rolled Ingot Iron 18 Gage and Heavier

Ashland(8) A10	3.60
Cleveland R2	3.95
Ind.Harbor,Ind. I-2	3.60
Warren,O. R2	3.95

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2	4.70
Middletown,O. A10	4.60
Warren,O. R2	4.70

SHEETS, Galvanized Ingot Iron No. 10 flat

Ashland,Ky.(8) A10	4.65
Canton,O. R2	5.15
Ind.Harbor,Ind. I-2	4.80

SHEETS, ZINCGRIP Ingot Iron

Butler,Pa. A10	4.90
Middletown,O. A10	4.90

SHEETS, Wrought Iron

	An'l	Galv.
Apollo,Pa. B14	12.00	15.50

SHEETS, Drum Body

Pittsburg,Calif. C11	4.05
Torrance,Calif C11	4.05

SHEETS, ALUMINIZED

Butler,Pa. A10	7.75

SHEETS, Well Casing

Fontana, Calif. K1	4.80

TIN PLATE, Electrolytic (Base Box)

	0.25 lb	0.50 lb	0.75 lb
Aliquippa,Pa. J5	$6.35	$6.60	$6.85
Fairfield,Ala. T2	6.45	6.70	6.95
Gary,Ind. C3	6.35	6.60	6.85
GraniteCity,Ill. G4	6.55	6.80	7.05
Ind.Harbor,Ind. I-2, Y1	6.35	6.60	6.85
Irvin,Pa. C3	6.35	6.60	6.85
Niles,O. R2	6.35	6.60	6.85
Pittsburg,Calif. C11	7.10	7.35	7.60
SparrowsPoint,Md. B2	6.45	6.70	6.95
Weirton,W.Va. W6	6.35	6.60	6.85
Yorkville,O. W10	6.35	6.60	6.85

SHEETS, SILICON, H.R. or C.R.(22 Ga.) COILS (Cut Lengths ½c lower)

	Field	Arma-ture	Elec-tric	Motor	Dyna-mo
BeechBottom W10 (cut lengths)	...	...	6.70	7.95	8.75
Brackenridge,Pa. A4	...	...	7.20	8.45	9.25
GraniteCity,Ill. G4(cut lengths)	...	...	6.90	8.15	...
Ind.Harbor, Ind. I-2	6.40	6.70	(34)	...	...
Mansfield,O. E6 (cut lengths)	5.90	6.20	6.70	7.95	8.75
Niles,O. N12 (cut lengths)	...	6.20	6.70	...	...
Vandergrift,Pa. C3	...	6.70	7.20	8.45	9.25
Warren,O. R2	6.40	6.70	7.20	8.45	9.25
Zanesville,O. A10	...	6.70	7.20	8.45	9.25

SHEETS, SILICON (22 Ga. Base) Coils (Cut Lengths ½c lower)

Transformer Grade	72	65	58	52
BeechBottom W10 (cut lengths)	9.30	9.85	10.55	11.35
Brackenridge,Pa. A4	9.80	10.35	11.05	....
Vandergrift,Pa. C3	9.80	10.35	11.05	11.85
Warren,O. R2	9.80	....	....	....
Zanesville,O. A10	9.80	10.35	11.05	11.85

H.R. or C.R. COILS AND CUT LENGTHS, SILICON (22 Ga.)

	T-100	T-90	T-80	T-73
Butler,Pa. A10 (C.R.)	....	....	14.20	14.70
Vandergrift,Pa. C3	12.35	13.20	14.20	14.70

TIN PLATE, American 1.25 1.50 COKE (Base Box) lb lb

Aliquippa J5	$7.30	$7.50
Fairfield,Ala. T2	7.40	7.60
Gary, C3	7.30	7.50
Ind.Harbor I-2, Y1	7.30	7.50
Irvin,Pa. C3	7.30	7.50
Pitts.Cal. C11	8.05	8.25
Sp.Pt.,Md. B2	7.40	7.60
Warren R2	7.30	7.50
Weirton W6	7.30	7.50
Yorkville,O. W10	7.30	7.50

CANMAKING BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$5.60
Fairfield,Ala. T2	5.70
Gary,Ind. C3	5.60
GraniteCity,Ill. G4	5.80
Ind.Harbor,Ind. I-2, Y1	5.60
Irvin,Pa. C3	5.60
Niles,O. R2	5.60
Pittsburg,Calif. C11	6.35
SparrowsPoint,Md. B2	5.70
Warren,O. R2	5.60
Weirton,W.Va. W6	5.60
Yorkville,O. W10	5.60

HOLLOWARE ENAMELING Black Plate (29 gage)

Aliquippa,Pa. J5	5.30
Follansbee,W.Va. F4	5.30
Gary,Ind. C3	5.30
GraniteCity,Ill. G4	5.50
Ind.Harbor,Ind. Y1	5.30
Irvin,Pa. C3	5.30
Niles,O. R2	5.30
SparrowsPoint,Md. B2	5.40
Warren,O. R2	5.30
Yorkville,O. W10	5.30

SHEETS, Enameling Iron

Ashland,Ky.(8) A10	4.40
Cleveland R2	4.40
Ecorse,Mich. G5	4.70
Gary,Ind. C3	4.40
GraniteCity, Ill. G4	4.60
Ind.Harbor,Ind. I-2	4.40
Irvin,Pa. C3	4.40
Middletown,O. A10	4.40
Youngstown Y1	4.40

STRIP, Hot-Rolled, High-Strength Low-Alloy

Atlanta(9) A11	5.10
Bessemer,Ala. T2	4.95
Conshohocken,Pa. A3	4.95
Ecorse,Mich. G5	5.15
Fairfield,Ala. T2	4.95
Fontana,Cal. K1	6.64
Gary,Ind. C3	4.95
Ind.Harb.,Ind. I-2, Y1	4.95
Lackawanna,N.Y. B2	4.95
LosAngeles(25) B3	5.70
Sharon,Pa. S3	4.95
So.SanFrancisco(25) B3	5.70
SparrowsPoint,Md. B2	4.95
Warren,O. R2	4.95
Weirton,W.Va. W6	4.95
Youngstown C3, Y1	4.95

STRIP, Hot-Rolled Alloy

Bridgeprt,Conn.(10) S15	5.10
Carnegie,Pa. S18	5.10
Fontana,Calif. K1	6.30
Gary,Ind. C3	5.10
Houston,Tex. S5	5.50
KansasCity,Mo. S5	5.70
NewBritn,Conn.(10) S15	5.10
Sharon,Pa. S3	5.10
Youngstown C3	5.10

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	3.50
Warren,O. R2	3.85

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	3.25
Alton,Ill.(1) L1	3.25
Ashland,Ky.(8) A10	3.25
Atlanta A11	3.40
Bessemer,Ala. T2	3.25
Bridgeprt,Conn.(10) S15	3.50
Buffalo(27) R2	3.25
Butler,Pa. A10	3.25
Carnegie,Pa. S18	3.50
Conshohocken,Pa. A3	3.50
Detroit M1	4.05
Ecorse,Mich. G5	3.45
Fairfield,Ala T2	3.25
Fontana,Calif. K1	4.40
Gary,Ind. C3	3.25
Houston,Tex. S5	3.65
Ind.Harbor,Ind. I-2, Y1	3.25
KansasCity,Mo.(9) S5	3.85
Lackawanna,N.Y. B2	3.25
LosAngeles B3	4.00
Milton,Pa. B6	3.25
Minnequa,Colo. C10	4.30
NewBritain(10) S15	3.50
N.Tonawanda,N.Y. B11	3.25
Pittsburg,Calif. C11	4.00
Riverdale,Ill. A1	3.25
SanFrancisco S7	4.00
Seattle B3, N14	4.25
Sharon,Pa. S3	3.50
So.Chicago,Ill. W14	3.25
So.SanFrancisco B3	4.00
SparrowsPoint,Md. B2	3.25
Torrance,Calif. C11	4.00
Warren,O. R2	3.25
Weirton,W.Va. W6	3.25
WestLeechburg,Pa. A4	3.50
Youngstown C3, Y1	3.25

STRIP, Cold-Rolled Alloy Steel

Bridgeprt,Conn.(10) S15	9.50
Carnegie,Pa. S18	9.50
Cleveland A7	9.50
Dover,O. G6	9.50
Fontana,Calif. K1	11.15
Harrison,N.J. C18	9.50
NewBritn.Conn.(10) S15	9.50
Pawtucket,R.I.(11) NS	9.50
Pawtucket,R.I.(12) NS	9.80
Sharon,Pa. S3	9.50
Worcester,Mass. A7	9.80
Youngstown C8	9.50

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	4.75

STRIP, Cold-Finished, Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Bridgeport,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
Bristol,Conn. W1	...	...	6.85	8.80	...
Carnegie,Pa. S18	...	5.95	6.55	8.50	10.80
Cleveland A7	4.15	5.95	6.55	8.50	10.80
Dover,O. G6	4.15	5.95	6.55	8.50	10.80
FranklinPark,Ill. T6	4.50	6.10	6.70	8.65	...
Harrison,N.J. C18	...	...	6.85	8.80	11.10
Mattapan,Mass. T6	4.65	6.25	6.85	8.80	11.10
NewBritn.,Conn.(10) S15	4.15	5.95	6.55	8.50	10.80
NewCastle,Pa. B4	4.15	5.95	6.55	8.50	...
NewCastle,Pa. E5	4.50	5.95	6.55	8.50	10.80
NewYork W3	...	6.30	6.90	8.85	11.15
Pawtucket,R.I. NS: Cleve.orPitts.Base	4.70	5.95	6.55	8.50	10.80
Worcester,Base	4.65	6.25	6.85	8.80	11.10
Sharon,Pa. S3	4.50	5.95	6.55	8.50	10.80
Trenton,N.J. R5	...	6.25	6.85	8.80	11.10
Wallingford,Conn. W2	4.65	6.25	6.85	8.80	11.10
Weirton,W.Va. W6	4.15	5.95	6.55	8.50	10.80
Worcester,Mass. A7	4.45	6.25	6.85	8.80	11.10
Worcester,Mass. T6	4.65	6.25	6.85	8.80	11.10
Youngstown C8	4.15	5.95	6.55	8.50	10.80

Spring Steel (Tempered)

Trenton,N.J. R5	...	...	9.30	11.25	13.85
Harrison,N.J. C18	...	...	9.30	11.25	13.85

STRIP, Cold-Rolled Carbon

Anderson,Ind.(40) G6	4.50
Berea,O. C7	5.60
Bridgeprt,Conn.(10) S15	4.50
Butler,Pa. A10	4.15
Cleveland A7, J5	4.15
Dearborn,Mich. D3	4.75
Detroit D2	4.75
Detroit M1	4.95
Dover,O.(40) G6	4.50
Ecorse,Mich. G5	4.35
Follansbee,W.Va. F4	4.50
Fontana,Calif. K1	5.75
FranklinPark,Ill. T6	4.55
Ind.Harbor,Ind. I-2	4.30
Lackawanna,N.Y. B2	4.15
LosAngeles C1	5.85
Mattapan,Mass. T6	5.00
Middletown,O. A10	4.15
NewBritain(10) S15	4.50
NewCastle,Pa. B4	4.50
NewCastle,Pa.(40) E5	4.55
NewHaven,Conn. D2	5.00
NewHaven,Conn. A7	4.65
NewYork W3	5.00
Pawtucket,R.I. R3	5.15
Pawtucket,R.I.(21) NS	5.00
Riverdale,Ill. A1	4.55
Rome,N.Y. R6	4.15
Sharon,Pa. S3	4.50
SparrowsPoint,Md. B2	4.15
Trenton,N.J.(13) R5	5.00
Wallingford,Conn. W2	5.00
Warren,O.(40) T5	4.55
Warren,O. R2	4.50
Weirton,W.Va. W6	4.15
Youngstown C8, (40)	4.50
Youngstown Y1	4.15

STRIP, Cold-Rolled, High-Strength Low-Alloy

Cleveland A7, J5	6.20
Dover,O. G6	6.20
Ecorse,Mich. G5	6.40
Fontana,Calif. K1	6.95
Lackawanna,N.Y. B2	6.40
Sharon,Pa. S3	6.20
SparrowsPoint,Md. B2	6.40
Warren,O. R2	6.20
Weirton,W.Va. W6	6.20
Youngstown Y1	6.20

STRIP, Electro Galvanized

Dover,O. G6	4.55
Weirton,W.Va. W6	4.15
Youngstown C8	4.15

Key to Producing Companies

A1 Acme Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A7 American Steel & Wire
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.
A13 American Cladmetals Co
B1 Babcock & Wilcox Tube
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B6 Boiardi Steel Corp.
B8 Braeburn Alloy Steel
B11 Buffalo Bolt Co.
B14 A. M. Byers Co.
C1 Calif. Cold Rolled Steel
C2 Calumet Steel Div., Borg-Warner Corp.
C3 Carnegie-Illinois Steel
C4 Carpenter Steel Co.
C5 Central Iron & Steel Div. Barium Steel Corp.
C7 Cleve.Cold.Roll.MillsCo.
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia Steel Co.
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
D2 Detroit Steel Corp.
D3 Detroit Tube & Steel
D4 Disston & Son, Henry
D6 Driver Harris Co.
D7 Dickson Weatherproof Nail Co.
E1 Eastern Gas&Fuel Assoc
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.
F2 Firth Sterling Steel
F3 Fitzsimons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
G1 Geneva Steel Co.
G2 Globe Iron Co.
G3 Globe Steel Tubes Co.
G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.
H1 Hanna Furnace Corp.
H4 Heppenstall Co.
I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.
K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K5 Kidd Drawn Steel Co.
L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Electric Steel
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

TIGHT COOPERAGE HOOP

Atlanta A11	3.40
Riverdale,Ill. A1	3.40
Sharon,Pa. S3	3.65
Youngstown C3	3.40

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	5.90
Alton,Ill.(1) L1	5.90
Bartonville,Ill.(1) K4	5.90
Buffalo W12	5.90
Cleveland A7	5.90
Donora,Pa. A7	5.90
Duluth A7	5.90
Fostoria,O. S1	5.90
Johnstown,Pa. B2	5.90
LosAngeles B3	6.85
Milbury,Mass.(12) N6	6.20
Monessen,Pa. P7, P16	5.90
Palmer,Mass. W12	6.20
Pittsburg,Calif. C11	6.85
Portsmouth,O. P12	5.90
Roebling,N.J. R5	6.20
So.Chicago,Ill. R2	5.90
SparrowsPoint,Md. B2	6.00
Struthers,O. Y1	5.90
Trenton,N.J. A7	6.20
Waukegan,Ill. A7	5.90
Williamsport,Pa. B2	6.00
Worcester A7,J4,T6,W12	6.20
Worcester,Mass. N6	6.20

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	5.35
Buffalo W12	5.35
Cleveland A7	5.35
Crawfordsville,Ind. MS	5.35
Dover,O. G6	5.35
Fostoria,O. S1	5.50
Kokomo,Ind. C16	5.35
FranklinPark,Ill. T6	5.70
Massillon,O. R8	5.35
Monessen,Pa. P7, P16	5.35
Pawtucket,R.I.(12) N8	6.00
Trenton,N.J. R5	5.65
Worcester A7, T6, W12	5.65

WIRE, Fine and Weaving (8-in. Coils)

Bartonville,Ill.(1) K4	8.45
Buffalo W12	8.45
Chicago W13	8.45
Cleveland A7	8.45
Crawfordsville,Ind. MS	8.45
Fostoria,O. S1	8.45
Johnstown,Pa. B2	8.45
Kokomo,Ind. C16	8.45
Monessen,Pa. P16	8.45
Palmer,Mass. W12	8.75
Portsmouth,O. P12	8.45
Roebling,N.J. R5	8.75
Waukegan,Ill. A7	8.45
Worcester,Mass. A7,T6	8.75

WIRE, Tire Bead

Bartonville,Ill.(1) K4	10.55
Monessen,Pa. P16	10.80
Roebling,N.J. R5	10.80

WIRE, Manufacturers Bright, Low-Carbon

AlabamaCity,Ala. R2	4.50
Aliquippa,Pa. J5	4.50
Atlanta A11	4.60
Alton,Ill.(1) L1	4.50
Bartonville,Ill.(1) K4	4.50
Buffalo W12	4.50
Chicago W13	4.50
Cleveland A7, C20, R2	4.50
Crawfordsville,Ind. MS	4.60
Donora,Pa. A7	4.50
Duluth A7	4.50
Fairfield,Ala. T2	4.50
Fostoria,O.(24) S1	4.85
Houston S5	4.90
Johnstown,Pa. B2	4.50
Joliet, Ill. A7	4.50
KansasCity,Mo. S5	5.10
Kokomo,Ind. C16	4.60
LosAngeles B3	5.45
Minnequa,Colo. C10	4.75
Monessen,Pa. P7	4.50
Newark, 6-8ga. I-1	5.15
No. Tonawanda B11	4.50
Palmer, Mass. W12	4.80
Pittsburg,Calif. C11	5.45
Portsmouth,O. P12	4.50
Rankin,Pa. A7	4.50
So.Chicago,Ill. R2	4.50
So.SanFrancisco C10	5.45
SparrowsPoint,Md. B2	4.60
Sterling,Ill.(1) N15	4.50
Struthers,O. Y1	4.50
Torrance,Calif. C11	5.45
Waukegan,Ill. A7	4.50
Worcester,Mass. A7	4.80
Worcester,Mass. T6	4.95

WIRE, Upholstery Spring

Aliquippa,Pa. J5	5.55
Alton,Ill.(1) L1	5.55
Buffalo W12	5.55
Cleveland A7	5.55
Donora,Pa. A7	5.55
Duluth A7	5.55
Johnstown,Pa. B2	5.55
LosAngeles B3	6.50
Monessen,Pa. P7, P16	5.55
NewHaven,Conn. A7	5.85
Palmer,Mass. W12	5.85
Pittsburg,Calif. C11	6.50
Portsmouth,O. P12	5.55
Roebling,N.J. R5	5.85
So.Chicago,Ill. R2	5.55
SparrowsPoint,Md. B2	5.65
Struthers,O. Y1	5.55
Torrance,Calif. C11	6.50
Trenton,N.J. A7	5.85
Waukegan,Ill. A7	5.55
Worcester,Mass. A7	5.85

WIRE, Galv'd ACSR for Cores

Bartonville,Ill. K4	8.15
Monessen,Pa. P16	8.15
Roebling,N.J. R5	8.45
SparrowsPoint,Md. B2	8.25

ROPE WIRE

	Mild Plow	Plow	Imp. Plow
Bartonville,Ill. K4	8.05	8.05	8.30
Buffalo W12	8.05	8.05	8.30
Cleveland A7	8.05	8.05	8.30
Donora,Pa. A7	8.05	8.05	8.30
Fostoria,O. S1	8.05	8.05	8.30
Johnstown,Pa. B2	8.05	8.05	8.30
Monessen,Pa. P7, P16	8.35	8.05	8.30
NewHaven,Conn. A7	8.35	8.35	8.60
Palmer,Mass. W12	8.35	8.35	8.60
Portsmouth,O. P12	8.05	8.05	8.30
Roebling,N.J. R5	8.35	8.35	8.60
SparrowsPoint,Md. B2	8.15	8.15	8.40
Struthers,O. Y1	8.05	8.05	8.30
Trenton,N.J. A7	8.35	8.35	8.60
Waukegan,Ill. A7	8.05	8.05	8.30
Williamsport,Pa. B2	8.15	8.15	8.40
Worcester,Mass. J4, T6	8.35	8.35	8.60

WIRE, Merchant Quality

(6 to 8 gage)	An'ld Stone	Galv. Stone
AlabamaCity R2	5.35	5.60
Aliquippa J5	5.35	5.60
Atlanta A11	5.45	5.70
Bartonville(19) K4	5.35	5.60
Buffalo(31) W12	4.50	...
Cleveland A7	5.35	5.60
Crawfordsvil. MS	5.45	5.70
Donora A7	5.35	5.60
Duluth A7	5.35	5.60
Fairfield T2	5.35	5.60
Houston,Tex. S5	5.75	6.00
Johnstown B2	5.35	5.60
Joliet,Ill. A7	5.35	5.60
KansasCy.Mo. S5	5.95	6.20
Kokomo C16	5.45	5.70
LosAngeles B3	6.30	...
Minnequa C10	5.60	5.85
Monessen P7	5.35	5.60
Palmer(31) W12	4.80	...
Pitts.,Cal. C11	6.30	6.55
Prtsmth.(18) P12	5.35	5.60
Rankin A7	5.35	5.60
So.Chicago R2	5.35	5.60
So.S.Fran. C10	6.30	6.55
SparrowsPt. B2	5.45	5.70
Sterling,Ill.(1)N15	5.35	5.60
Struthers,O. Y1	5.35	5.60
Torrance,Cal. C11	6.30	...
Worcester A7	5.65	5.90

WIRE (16 gage)	An'ld Stone	Galv. Stone
Aliquippa J5	9.80	11.30
Bartonville(1) K4	9.80	11.30
Cleveland A7	9.80	11.30
Crawfrdvil. MS	9.80	11.30
Fostoria,O. S1	9.90	11.40
Johnstown B2	9.80	11.30
Kokomo C16	9.80	11.30
Minnequa C10	10.05	11.80
Palmer,Mass. W12	9.80	11.30
Pitts.,Cal. C11	10.15	11.65
Prtsmth.(18) P12	9.80	11.30
SparrowsPt. B2	9.90	11.40
Waukegan A7	9.80	11.30

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	126
Aliquippa,Pa. J5	126
Atlanta A11	128
Bartonville,Ill. K4	126
Crawfordsville MS	128
Donora,Pa. A7	126
Duluth,Minn. A7	126
Fairfield,Ala. T2	126
Houston,Tex. S5	134
Johnstown,Pa. B2	126
Joliet,Ill. A7	126
KansasCity,Mo. S5	138
Kokomo,Ind. C16	128
Minnequa,Colo. C10	131
Monessen,Pa. P7	126
Pittsburg,Calif. C11	146
Portsmouth,O.(18) P12	126
Rankin,Pa. A7	126
So.Chicago,Ill. R2	126
So.SanFran.,Calif. C10	146
SparrowsPoint,Md. B2	128
Sterling,Ill.(1) N15	126

FENCE POSTS

	Col.
ChicagoHts.,Ill. C2	116
Duluth A7	116
Franklin,Pa. F5	116
Huntington,W.Va. W7	116
Johnstown,Pa. B2	116
Joliet,Ill. A7	116
Marion,O. P11	116
Minnequa,Colo. C10	121
Moline,Ill. R2	112
So.Chicago R2	116
Williamsport,Pa. S19	130

WOVEN FENCE, 9-15½ Ga. Col.

AlabamaCity,Ala. R2	116
Ala.City,Ala.,17-18ga.R2	198
Aliquippa,Pa.9-14½ga.J5	116
Atlanta A11	118
Bartonville,Ill.(19) K4	116
Crawfordsville,Ind. MS	118
Donora,Pa. A7	116
Duluth A7	116
Houston,Tex. S5	124
Fairfield,Ala. T2	116
Johnstown,Pa. B2	116
Johnstn,17ga.6" B2	190
Johnstn,17ga.,4" B2	193
Joliet,Ill. A7	116
KansasCity,Mo. S5	128
Kokomo,Ind. C16	118
Minnequa,Colo. C10	121
Monessen,Pa. P7	116
Pittsburg,Calif. C11	139
Portsmouth,O.(18) P12	116
Rankin,Pa. A7	116
So.Chicago,Ill. R2	116
Sterling,Ill.(1) N15	116

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	113
Atlanta A11	114
Bartonville,Ill.(19) K4	113
Chicago W13	113
Crawfordsville MS	115
Donora,Pa. A7	113
Duluth A7	113
Fairfield,Ala. T2	113
Joliet,Ill. A7	113
KansasCity,Mo. S5	125
Kokomo,Ind. C16	115
Minnequa,Colo. C10	118
Pittsburg,Calif. C11	137
So.Chicago,Ill. R2	113
So.SanFran.,Calif. C10	137
SparrowsPoint,Md. B2	115
Sterling,Ill.(1) N15	113

AXLES

Ind.Harbor,Ind. S13	5.25
Johnstown,Pa. B2	5.25

JOINT BARS

Bessemer,Pa. C3	4.40
Fairfield,Ala. T2	4.40
Ind.Harbor,Ind. I-2	4.40
Joliet,Ill. C3	4.40
Lackawanna,N.Y. B2	4.40
Minnequa,Colo. C10	4.40
Steelton,Pa. B2	4.40

STANDARD TRACK SPIKES

Ind.Harbor,Ind. I-2, Y1	5.60
KansasCity,Mo. S5	5.85
Lebanon,Pa. B2	5.60
Minnequa,Colo. C10	5.60
Pittsburgh J5	5.60
Seattle B3	6.10
So.Chicago,Ill. R2	5.60
Struthers,O. Y1	5.60
Youngstown R2	5.60

RAILS

	Std. No. 1	Std. No. 2	Std. All No. 2	TeeRails 60 lb Under
Bessemer,Pa. C3	3.40	3.30	3.35	3.75
Ensley,Ala. T2	3.40	3.30	...	3.75
Fairfield,Ala. T2	...	...	...	3.75
Gary,Ind. C3	3.40	3.30	3.35	...
Huntington,W.Va. W7	...	...	...	3.75
Ind.Harbor,Ind. I-2	3.40	3.30	3.35	...
Johnstown,Pa. B2	...	...	...(16)	3.75
Lackawanna B2	3.40	3.30	...	3.75
Minnequa,Colo. C10	3.40	3.30	...	4.25
Steelton,Pa. B2	3.40	3.30	...	...
Williamsport,Pa. S19	...	...	...	4.00

NAILS & STAPLES, Stock To dealers & Mfrs. (7)

	Col.
AlabamaCity,Ala. R2	106
Aliquippa,Pa. J5	106
Atlanta A11	108
Bartonville,Ill.(19) K4	106
Chicago,Ill. W13	106
Cleveland A9	111
Crawfordsville,Ind. MS	108
Donora,Pa. A7	106
Duluth A7	106
Fairfield,Ala. T2	106
Galveston,Tex. D7	114
Houston,Tex. S5	114
Johnstown,Pa. B2	106
Joliet,Ill. A7	106
KansasCity,Mo. S5	118
Kokomo,Ind. C16	108
Minnequa,Colo. C10	111
Monessen,Pa. P7	106
Pittsburg,Calif. C11	125
Portsmouth,O. P12	106
Rankin,Pa. A7	106
So.Chicago,Ill. R2	106
SparrowsPoint,Md. B2	108
Sterling,Ill.(1) N15	106
Torrance,Calif. C11	126
Worcester,Mass. A7	112

NAILS & STAPLES, Non-Stock

AlabamaCity,Ala. R2	5.35
Bartonville,Ill.(19) K4	5.35
Crawfordsville,Ind. MS	5.45
Donora,Pa. A7	5.35
Duluth A7	5.35
Johnstown,Pa. B2	5.35
Joliet,Ill. A7	5.35
Kokomo,Ind. C16	5.45
Minnequa,Colo. C10	5.60
Pittsburg,Calif. C11	6.30
Portsmouth,O. P12	5.35
Rankin,Pa. A7	5.35
So.Chicago,Ill. R2	5.35
SparrowsPoint,Md. B2	5.45
Worcester,Mass. A7	5.65

NAILS, Cut (100 lb keg) To dealers (33)

Conshohocken,Pa. A3	$6.75
Wheeling W.Va. W10	6.75

TIE PLATES

Fairfield,Ala. T2	4.20
Gary,Ind. C3	4.20
Ind.Harbor,Ind. I-2	4.20
Lackawanna,N.Y. B2	4.20
Minnequa,Colo. C10	4.20
Pittsburg,Calif. C11	4.35
Seattle B3	4.35
Steelton,Pa. B2	4.20
Torrance,Calif. C11	4.35
Weirton,W.Va. W6	4.20

TRACK BOLTS (20) Treated

KansasCity,Mo. S5	9.10
Lebanon,Pa.(32) B2	8.85
Minnequa,Colo. C10	9.10
Pittsburgh O3, P14	9.10
Seattle B3	9.35

Key to Producing Companies

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M5 Medart Co.
M6 Mercer Tube & Mfg. Co.
M8 Mid-States Steel & Wire
M9 Midvale Co.
M10 Missouri-Illinois Furnace
M12 Moltrup Steel Products
M13 Monarch Steel Co.
M14 McInnes Steel Co.
N2 National Supply Co.
N3 National Tube Co.
N5 Nelsen Steel & Wire Co.
N6 New Eng.HighCarb.Wire
N8 Newman-Crosby Steel
N12 Niles Rolling Mill Co.
N14 Nrthwst. Steel Roll.Mills
N15 Northwestern S.&W. Co.
N16 New Delphos Mfg. Co.
O3 Oliver Iron & Steel Corp.
O4 Oregon Steel Mills
P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P9 Pittsburgh Tube Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S5 Sheffield Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S9 Sloss-Sheffield S.&I. Co.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S16 Struthers Iron & Steel
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
T2 Tenn. Coal, Iron & R.R.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div. Am. Rad. & Stan. San.
U1 Ulster Iron Works
U4 Universal Cyclops Steel
V2 Vanadium Alloys Steel
V3 Vulcan.Crucible Steel Co.
W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 West.Auto.Mach.Screw
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W16 Worth Steel Co.
W18 Wyckoff Steel Co.
Y1 Youngstown Sheet&Tube

TOOL STEEL

Grade	Cents per lb	Grade	Cents per lb
Reg. Carbon	21.00	18W,4Cr,3V	126.00
Extra Carbon	24.50	18W,4Cr,2V,9Co	185.50
Spec. Carbon	29.50-31.50	18W,4Cr,2V,6Co	169.50
Oil Hardening	32.00	18.25W,4.25Cr,1V,4.75Co	156.50
Cr Hot Wrk.	32.00	20.25W,4.25Cr,1.6V,12.25Co	293.50
Hi-Carbon-Cr	57.50	1.5W,4Cr,1V,8.5Mo	71.50
18W,4Cr,1V	100.00	6.4W,4.5Cr,1.9V,5Mo	76.50
18W,4Cr,2V	113.00	6W,4Cr,3V,6Mo	97.00

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, D4, F2, H4, J3, L3, M14, S8, T7, U4, V2, V3

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant. (4) Reinforcing.
(5) Philadelphia del.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 gage and heavier.
(9) 6 in. and narrower.
(10) Pittsburgh base.
(11) Cleveland & Pittsburgh base.
(12) Worcester, Mass. base.
(13) 3" & wider; over ½" to under 3" 5.50c.
(14) Also wide flange beams.
(15) ½" and thinner.
(16) 40 lb and under.
(17) Flats only.
(18) To dealers.
(19) Chicago & Pittsburgh base.
(20) Deduct 0.25c for untreated.
(21) New Haven, Conn. base.
(22) Del. San Fran. Bay area.
(24) Deduct 0.35c for finer than 15 Ga.
(25) Bar mill bands.
(26) Reinforcing, to fabricators (⅜" bar, elec. furn. billet, 5.03c); to consumers, 5.08c.
(27) Bar mill sizes.
(28) Bonderized.
(31) Not annealed.
(32) Untreated.
(33) To jobbers, deduct 20 cents.
(34) 6.70c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) 15 Ga. & lighter; 60" & narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 4.75c. 0.035" and heavier.

STANDARD PIPE, T. & C.

BUTTWELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Black A	Black B	Black C	Galvanized D	Galvanized E	Galvanized F
⅛	5.5c	0.24	36.5	34.5	33.5	5.5	3.5	5.5
¼	6.0	0.42	33.5	31.5	30.5	5.5	3.5	6.5
⅜	6.0	0.57	29.0	27.0	26.0	0.5	+1.5	2.5
½	8.5	0.85	40.5	38.5	39.5	21.0	19.0	20.0
¾	11.5	1.13	43.5	41.5	42.5	25.0	23.0	24.0
1	17.0	1.68	46.0	44.0	45.0	28.0	26.0	27.0
1¼	23.0	2.28	46.5	44.5	45.5	28.5	26.5	27.5
1½	27.5	2.73	47.0	45.0	46.0	29.0	27.0	28.0
2	37.0	3.68	47.5	45.5	46.5	29.5	27.5	28.5
2½	58.5	5.82	48.0	46.0	47.0	30.0	28.0	29.0
3	76.5	7.62	48.0	46.0	47.0	30.0	28.0	29.0

Column A: Etna, Pa. N2; Monaca, Pa. P9; Sharon, Pa. M6; Butler, Pa. ⅛-⅜", F6; Benwood, W. Va., 1½ percentage points lower on ⅛", 2 points lower on ¼", 3 points lower on ⅜", W10. Wheatland, Pa., 2 points lower on ⅛" through ⅜", W9. Following make ½" and larger: Lorain, O. N3; Youngstown, plus 43% on 3½" and 4", R2; Youngstown Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 11 points lower on ½" and larger continuous weld and 31% on 3½" and 4".

Columns B & E: Sparrows Point, Md. B2.

Columns C & F: Indiana Harbor, Ind., ½" through 3", Y-1; Alton, Ill. (Lorain, O., base) L1.

Column D: Etna, Pa. N2; Monaca, Pa. quotes 1 pt lower on ½" through 3", P9; Sharon, Pa. M6, quotes 1 pt lower on ¼", 1 pt higher on ⅜" and 1 pt lower on ½" through 3"; Butler, Pa., ¼" through ⅜", F6; Benwood, W. Va., W10 except 3½ pts lower on ⅛", 2½ pts lower on ¼", 3 pts lower on ⅜" Wheatland, Pa., except 2 pts lower on ⅛", ¼" and ⅜"; W9. Following make ½" and larger: Lorain, N3; Youngstown, plus 24.5% on 3½" and 4", R2; Youngstown, Y1; Aliquippa, Pa. J5. Fontana, Calif. K1 quotes 8 pts lower on ½" and larger continuous weld and 15.5% on 3½" and 4".

SEAMLESS AND ELECTRIC WELD Size Inches	List Per Ft	Pounds Per Ft	Carload Discounts from List, % Seamless Black A	Seamless Galv. B	Elec. Weld Black C	Elec. Weld Galv. D
2	37.0c	3.68	36.0	17.5	36.0	17.5
2½	58.5	5.82	39.0	20.5	39.0	20.5
3	76.5	7.62	39.0	20.5	39.0	20.5
3½	92.0	9.20	41.0	22.5	41.0	22.5
4	$1.09	10.89	41.0	22.5	41.0	22.5
5	1.48	14.81	41.0	22.5	41.0	22.5
6	1.92	19.18	41.0	22.5	41.0	22.5

Column A: Aliquippa J5; Ambridge N2; Lorain N3; Youngstown Y1.

Column B: Aliquippa J5; Lorain, N3; Youngstown, Y1.

Columns C & D: Youngstown R2.

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft inclusive.

O.D. In.	B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
1	13	12.36	14.39	13.96	13.96
1¼	13	14.63	17.05	14.19	16.54
1½	13	16.17	19.02	15.68	18.45
1¾	13	18.39	21.64	17.84	20.99
2	13	20.61	24.24	19.99	23.51
2¼	13	22.96	27.03	22.27	26.22
2¼	12	25.29	29.76	24.53	28.87
2½	12	27.71	32.58	26.88	31.60
2¾	12	29.36	34.53	28.48	33.49
3	12	30.82	36.27	29.90	35.18
3¼	11	35.87	42.22	34.79	40.95
3½	11	38.52	45.35	37.36	43.99
4	10	47.82	56.25	46.39	54.56
4½	9	63.37	74.59	61.47	72.35
5	9	73.37	86.32	71.17	83.73
6	7	112.62	132.51	....	....

Boiler tube producers include Babcock & Wilcox Tube Co., National Tube Co., Globe Steel Tubes Co., Pittsburgh Steel Co., Republic Steel Corp., Standard Tube Co.

CLAD STEELS

(Cents per pound)

Cladding Stainless	Plates Carbon Base 10%	Plates Carbon Base 20%	Strip Cold-Rolled Carbon Base 10% Both Sides	Sheets Carbon Base 10%	Sheets Carbon Base 20%	Sheets Copper Base Both Sides
302	....	....	....	19.75	21.50–24.00	75.00
304	23.50	26.50–28.00	....	20.75–23.50	22.50–25.5	77.00
305	....	....	....	....	....	79.00
309	29.00	33.50	....	....	....	....
310	35.00	39.50	....	....	....	105.00
316	28.00	31.00–32.50	....	26.00	28.00–34.5	....
317	33.00	37.50	....	....	....	....
318	32.00	36.50	....	....	....	....
321	25.00	29.50	....	23.00	25.00	90.00
347	26.00	29.00–30.50	....	24.00	26.00–31.5	94.00
405	19.75	26.25	....	....	....	....
410	19.25	25.75	....	....	....	....
430	19.25	25.75	....	....	....	....
Nickel	31.00	41.00	31.50 41.00	....	....	88.00
Inconel	39.00	51.00	....	....	....	140.00
Monel	32.00	42.00	26.50 33.50	....	....	83.00
Copper*	....	....	20.70† 25.65‡	....	....	....

* Deoxidized. † 17.20c for hot-rolled. ‡ 22.40c for hot-rolled. Production points for carbon base products: Stainless plates, sheets, Conshohocken, Pa. A3 and New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. W16, Coatesville, Pa. L7 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; nickel monel, copper-clad strip, Carnegie, Pa., S18. Production point for copper-base sheets is Carnegie, Pa. A13.

BOLTS, NUTS

CARRIAGE, MACHINE BOLTS

(F.o.b. midwestern plants; per cent off list for less than case lots to consumers)

6 in. and shorter:
- ½-in. & smaller diam.. 27
- ⅝-in. & ⅝-in. 29
- ¾-in. and larger 26

Longer than 6 in.:
- All diams. 22

Lag bolts, all diams.:
- 6 in. and shorter 30
- over 6 in. long 28

Ribbed Necked Carriage. 26
Blank 40
Plow 40
Step, Elevator, Tap, and Sleigh Shoe 28
Tire bolts 20
Boiler & Fitting-Up bolts 37

NUTS

H.P. & C.P. Reg. & Heavy Square:	Reg.	Heavy
½-in. and smaller	25	
⅝-in. & ⅝-in.	23	
¾-in.-1½-in.	23	
1⅝ in. and larger	16	
H.P. Hex.:	Reg.	Heavy
½-in. & smaller	33	29
⅝-in. & ⅝-in..	28	25
¾-in.-1½-in. ..	25	23
1⅝ in. & larger	17	16
C.P. Hex:		
½-in. & smaller	33	29
⅝-in. & ⅝-in..	30	27
¾-in. & 1⅛ in.	27	24
1⅝ in. & larger	20	17

SEMIFINISHED NUTS

American Standard

(Per cent off list for less than case or keg quantities)

½-in. and smaller	Hvy.	Reg.	Lght.
⅝-in. & ⅝-in.	30	36	36
¾-in.-1½-in.	27	31	33
1⅝-in.&larger	17	21	..

STEEL STOVE BOLTS

(F.o.b. plant; per cent off list in packages)

Plain finish ..... 63.5 & 10
Plated finishes ... 50 & 10

HEXAGON CAP SCREWS

(1020 steel; packaged; per cent off list)

6 in. or shorter:
- ¼-in. through ⅝-in. .. 50
- ¾-in. through 1 in. ... 43

Longer than 6 in.:
- ¼-in. through ⅝-in. .. 33
- ¾-in. through 1 in. .. 13

SQUARE HEAD SET SCREWS

(Packaged; per cent off list)

1 in. diam. x 6 in. and shorter 46
1 in. and smaller diam. x over 6 in. 33

HEADLESS SET SCREWS

(Packaged; per cent off list)

No. 10 and smaller 41
¼-in. diam. & larger 24
N.F. thread, all diams. . 18

RIVETS

F.o.b. midwestern plants
Structural ½-in., larger 7.25c
⅞-in., under .....43 off

WASHERS, WROUGHT

F.o.b. shipping point, to jobbers .....List to 50c off

ELECTRODES

(Threaded, with nipples, unboxed, f.o.b. plant)

GRAPHITE

Inches Diam.	Length	Cents per lb
17,18,20	60,72	16.00
8 to 16	48,60,72	16.50
7	48,60	17.75
6	48,60	19.00
4, 5⅛	40	19.50
3	40	20.50
2½	24,30	21.00
2	24,30	23.00

CARBON

40	100,110	7.50
35	100,110	7.50
30	84,110	7.50
24	72 to 104	7.50
17 to 20	34,90	7.50
14	60,72	8.00
10,12	60	8.25

STAINLESS STEEL

(Cents per pound)

Type	Sheets	C.R. Strip	Bars Wire Structurals
301...	39.00	32.00	30.00
302...	39.00	34.50	30.00
303...	41.00	38.00	32.50
304...	41.00	36.50	31.50
309...	53.50	52.50	43.00
316...	54.50	56.50	47.50
321...	47.00	46.00	35.50
347...	51.50	50.00	40.00
410...	34.50	28.50	24.50
416...	35.00	35.00	25.00
420...	42.00	45.00	30.00
430...	37.00	29.00	25.00
501...	25.50	24.00	13.00
502...	26.50	25.00	14.00

Baltimore, Types 301 through 347 sheet, except 309 E2.

Baltimore, bars, wire and structurals A10.

Brackenridge, Pa., sheets A4.

Bridgeville, Pa., bars, wire, sheets & strip U4.

Butler, Pa., sheets and strip except Types 303, 309, 416, 420, 501 & 502 A10.

Carnegie, Pa., strip except Type 416, S18.

Cleveland, strip A7.

Detroit, strip, except Types 303, 309, 321, 416, 420, 501 and 502 M1.

Dunkirk,N.Y., bars, wire A4.

Duquesne, Pa., bars C3.

Fort Wayne, Ind., bars and wire, except Types 501 and 502 J6.

Gary, Ind., sheets except Type 416 C3.

Harrison, N. J., strip C18.

Harrison, N. J., Types 302, 304, 316 wire and strip D6.

Massillon, all products R2.

McKeesport, Pa., bars; sheets except Type 416 C3.

McKeesport, Pa., bars & wire except Types 301, 309, 501 & 502; strip Types 410 & 430 only F2.

Middletown, O., sheets except Types 303, 416, 420, 501 and 502 A10.

Midland, sheets & strip C18.

Munhall, Pa., bars C3.

Pittsburgh, sheets C18.

Reading, Pa., bars & strip C4.

So. Chicago, Ill., bars & structurals C3.

Syracuse, N. Y., bars, wire & structurals C18.

Titusville, Pa., bars, U4.

Wallingford, Conn., strip, except 309, W2 quotes 0.25 cents higher.

Washington, Pa., bars, sheets & strip J3.

Washington, Pa., Types 301 through 347 sheets & strip as listed except 303 & 309; 316 sheets 59.50c, strip 61.50c W4.

Watervliet, N. Y., structurals & bars A4.

Waukegan, bars & wire A7.

West Leechburg, Pa., strip, A4.

Youngstown, strip C8.

COAL, CHEMICALS

Spot, cents per gallon, ovens
Pure benzol 25.00-30.00
Toluol, one deg...21.00-28.00
Industrial xylol ..21.00-29.50

Per ton bulk, ovens
Sulphate of ammonia.$32-45

Cents per pound, ovens
Phenol, 40 (carlots, non-returnable drums) ..17.25
Do., less than carlots..18.00
Do., tank cars 15.50

FLUORSPAR

Metallurgical grade, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content, 70% or more, $39; less than 60%, $36. Imported, net ton, duty paid, metallurgical grade, $28-$29.

METAL POWDERS

(Per pound, f.o.b. shipping point in ton lots for minus 100 mesh, except as otherwise noted.)

	Cents
Sponge Iron:	
98+% Fe, carlots..	15.00
Swedish, c.i.f. New York, in bags ...7.40-8.50	
Electrolytic Iron:	
Annealed, 99.5% Fe	39.50
Unannealed, 99+% Fe	33.50
Unannealed 99+% Fe(minus 325 mesh)	48.50
Powder Flakes 44.50	
Carbonyl Iron:	
97.9-99.8%, size 5 to 10 microns..70.00-135.00	
Aluminum:	
Carlots, freight allowed	27.00
Atomized, 500 lb drums, freight allowed	30.00
Brass, 10-ton lots.28.50-31.25	
Copper:	
Electrolytic	33.75
Reduced	33.50
Lead	20.50
Manganese:	
Minus 100-mesh	52.00
Minus 35 mesh	48.00
Minus 200 mesh	56.00
Nickel unannealed ...	75.50
Nickel-Silver, 10-ton lots	41.75
Silicon	34.00
Solder (plus cost of metal)	8.50
Stainless Steel, 302 ..	75.00
Tin	$1.20
Zinc, 10-ton lots.20.50-28.00	
Tungsten:	Dollars
99%, minus 80 to 200 mesh, freight allowed:	
over 1000 lb	2.90
1000 lb	2.95
less than 1000 lb..	3.00
98.8% minus 65 mesh, freight allowed:	
1000 lb and over..	2.90
less than 1000 lb ..	3.00
Molybdenum:	
99%, minus 80 to 200 mesh, over 500 lb	2.25
200 to 500 lb	2.60
less than 200 lb ..	2.75
82-88%, freight allowed, 2000 lb and over..	2.40
less than 2000 lb..	2.45
Chromium, electrolytic 99% Cr min.	3.50

METALLURGICAL COKE

Price per net ton

BEEHIVE OVENS

Connellsvll,fur. .$14.00-14.50
Connellsvll,fdry. .15.00-16.00
New River, foundry ...19.00
Wise county, foundry..15.95
Wise county, furnace..15.20

OVEN FOUNDRY COKE

Kearney, N. J., ovens.$22.00
Everett, Mass., ovens
New England, del..‡23.40
Chicago, ovens 21.00
Chicago del. .....†22.45
Detroit, del. 24.91
Terre Haute, ovens ...21.20
Milwaukee, ovens 21.75
Indianapolis, ovens 20.75
Chicago, del. 24.12
Cincinnati, del. 23.67
Detroit, del. 24.65
Ironton, O., ovens 20.40
Cincinnati, del. 22.71
Painesville, O., ovens..21.90
Buffalo, del. 24.02
Cleveland, del. 23.62
Erie, del. 22.04
Birmingham, ovens 19.15
Birmingham, del. 20.20
Philadelphia, ovens ..21.25
Neville Island,Pa.,ovens 21.00
Swedeland, Pa., ovens..21.20
St. Louis, ovens 22.99
St. Louis, del. 24.12
Portsmouth, O., ovens..20.15
Cincinnati, del. 22.71
Detroit, ovens 21.65
Detroit, del. *22.65
Buffalo, del. 24.69
Flint, del. 24.09
Pontiac, del. 23.04
Saginaw, del. 24.40

Includes representative switching charge of: *, $1.00; †, $1.45, one-track charge being $1.20, two tracks $1.40, and three or more tracks $1.50. ‡ Or within $4.15 freight zone from works.

WAREHOUSE STEEL PRODUCTS

(Prices, cents per pound, for delivery within switching limits, subject to extras)

	SHEETS			STRIP		BARS			Standard Structural Shapes	PLATES	
	H.R. 18 Ga., Heavier*	C.R.	Gal. 10 Ga.†	H.R.*	C.R.*	H.R. Rds.	C.F. Rds.	H.R. Alloy 4140§		Carbon	Floor
New York(city)	5.82	6.84	7.73	6.14	...	5.97	6.64	8.60	5.95	6.18	7.64
New York(c'try)	5.52	6.64	7.53	5.84	...	5.67	6.44	8.40	5.65	5.88	7.34
Boston (city) ..	5.95	6.75	7.37	5.90	...	5.80	6.39	8.70	5.95	6.28	7.48
Boston (c'try) .	5.75	6.55	7.17	5.70	...	5.60	6.19	8.50	5.75	6.08	7.28
Phila. (city) ..	6.60-6.70	6.75	7.10	5.90	...	5.85	6.46	8.40	5.70	5.90	7.00
Phila. (c'try)..	6.35-6.45	6.50	6.85	5.65	...	5.60	6.21	8.15	5.45	5.65	6.75
Balt. (city) ...	5.35	6.59	6.66	5.79	...	5.79	6.39	...	5.89	5.60	7.24
Balt. (c'try) ..	5.15	6.39	6.46	5.59	...	5.59	6.19	...	5.69	5.40	7.04
Norfolk, Va. ..	6.10	...	...	6.30	...	6.15	7.20	...	6.20	6.15	7.55
Richmond, Va..	5.55	...	6.80	5.83	...	5.73	6.30	...	5.83	5.65	7.33
Wash. (w'hse).	5.56	6.80	6.73	6.00	...	6.00	6.62	...	6.10	5.81	7.45
Buffalo (del.)..	5.35	6.15	7.10	5.61	...	5.35	5.95	10.10††[5]	5.55	5.85	7.15
Buffalo (w'hse).	5.15	5.95	6.90	5.41	...	5.15	5.75	9.90††[5]	5.35	5.65	6.95
Pitts. (w'hse)..	5.15	5.95*	6.60-6.70	5.20	6.15	5.10	5.75	9.55††	5.25	5.35	6.60
Detroit (w'hse)	5.33	6.08*	7.09	5.49	...	5.39	5.91	9.86††[5]	5.64	5.79	6.88
Cleveland (del.)	5.35	6.15	7.30	5.44	6.35	5.32	5.95	8.31	5.57	5.72	6.92
Cleve. (w'hse).	5.15	5.95	7.10	5.24	6.15	5.12	5.75	8.16	5.37	5.52	6.72
Cincin. (city)..	5.57	6.14	6.54	5.50	...	5.50	6.11	...	5.79	5.94	7.10
Chicago (city) .	5.35	6.15	7.05	5.30	...	5.30	5.85	9.75††[5]	5.45	5.60	6.80
Chicago (w'hse)	5.15	5.95	6.85	5.10	...	5.10	5.65	9.55††[5]	5.25	5.40	6.60
Milwaukee(city)	5.49	6.29	6.94	5.44	...	5.44	6.09	9.89††[5]	5.59	5.74	6.94
Milwau. (c'try)	5.29	6.09	7.14	5.24	...	5.24	5.89	9.69††[5]	5.39	5.54	6.74
St. Louis (del.)	5.68	6.48	7.28	5.63	...	5.63	6.28	10.08††[5]	5.78	5.93	7.13
St. L. (w'hse).	5.48	6.28	7.08	5.43	...	5.43	6.08	9.88††[5]	5.58	5.73	6.93
Kans. City(city)	5.95	6.75	7.60	5.90	...	5.90	6.55	...	6.05	6.20	7.60
KansCity(w'hse)	5.75	6.55	7.40	5.70	...	5.70	6.35	...	5.85	6.00	7.40
Omaha, Nebr. .	6.13‡	...	8.33	6.13	...	6.18	6.98	...	6.18	6.38	7.83
Birm'ham (del.)	5.30	6.10	6.30[2]	5.25	...	5.25	6.88	...	5.40	5.55	7.83
Birm'hm(w'hse)	5.15	5.95	6.15[2]	5.10	...	5.10	...	...	5.25	5.40	...
Los Ang. (city)	6.10	7.65	8.20	6.15	8.90	6.10	7.75	...	6.10	6.20	8.40
L. A. (w'hse)..	5.90	7.45	8.00	5.95	8.70	5.90	7.55	...	5.90	6.00	8.20
San Francisco .	6.50[9]	7.60[3]	7.50[3]	7.45[9]	8.25[3]	6.30[9]	7.55	...	6.30[9]	6.40[9]	8.50[9]
Seattle-Tacoma.	6.60	8.15[3]	...	6.85	...	6.35	8.50	10.10	6.20	6.35[7]	8.40[7]

* Prices do not include gage extras; † prices include gage and coating extras, except Birmingham (coating extra excluded) and Los Angeles (gage extra excluded); ‡ includes extra for 10 gage; § as rolled; †† as annealed. Base quantities, 2000 to 9999 lb except as noted: Cold-rolled strip, 2000 lb and over; cold-finished bars, 2000 lb and over; [2]—500 to 1499 lb; [9]—450 to 1499 lb; [5]—1000 to 1999 lb; [7]—300 to 999 lb; [9]—400 to 9999 lb.

REFRACTORIES

(Prices per 1000 bricks, f.o.b. plant)

FIRE CLAY BRICK

Super Duty: St. Louis, Vandalia, Farber, Mexico, Mo., Olive Hill, Ky., Clearfield, or Curwensville, Pa., Ottawa, Ill., $106. Hard-fired, $142 at above points.

High-Heat Duty: Salina, Pa. $91; Woodbridge, N. J., St. Louis, Farber, Vandalia, Mexico, Mo., West Decatur, Orviston, Clearfield, Beach Creek, or Curwensville, Pa., Olive Hill, Hitchins, Haldeman, or Ashland, Ky., Troup, or Athens, Tex., Stevens Pottery, Ga., Portsmouth, or Oak Hill, O., Ottawa, Ill., $86.

Intermediate-Heat Duty: St. Louis, or Vandalia, Mo., West Decatur, Orviston, Beach Creek, or Clearfield, Pa., Olive Hill, Hitchins, or Haldeman, Ky., Athens, or Troup, Tex., Stevens Pottery, Ga., Portsmouth, O., Ottawa, Ill., $80.

Low-Heat Duty: Oak Hill, or Portsmouth, O., Clearfield, Orviston, Pa., Bessemer, Ala., $72; Ottawa, Ill., $70.

LADLE BRICK

Dry Press: Freeport, Merill Station, Clearfield, Pa., Irondale, Wellsville, O., Chester, W. Va., New Cumberland, W. Va., $60.

Wire Cut: Chester, W. Va., Wellsville, O., New Cumberland, W. Va., $58.

MALLEABLE BUNG BRICK

St. Louis, Mo., Olive Hill, Ky., $96; Ottawa, Ill., $90; Beach Creek, Pa., $86.

SILICA BRICK

Mt. Union, Claysburg, or Sproul, Pa., Portsmouth, O., Ensley, Ala., $86; Hays, Pa., $91; Joliet or Rockdale, Ill., E. Chicago, Ind., $95; Lehi, Utah, Los Angeles, $101.

Eastern Silica Coke Oven Shapes (net ton): Claysburg, Mt. Union, Sproul, Pa., Birmingham, $84.

Illinois Silica Coke Oven Shapes (net ton): Joliet or Rockdale, Ill., E. Chicago, Ind., Hays, Pa., $85.

BASIC BRICK

(Base prices per net ton; f.o.b. works, Baltimore or Chester, Pa.)

Burned chrome brick, $68; chemical-bonded chrome brick, $72; magnesite brick, $94; chemical-bonded magnesite, $83.

MAGNESITE

(Base prices per net ton, f.o.b. works, Chewelah, Wash.)

Domestic dead-burned, ⅜" grains; bulk, $33; single paper bags, $38.

DOLOMITE

(Base prices per net ton)

Domestic, dead-burned bulk; Bonne Terre, Mo., Blue Bell, Williams, Millville, W. Va., Gibsonburg, Woodville, O., $12.25; Thornton, McCook, Ill., $12.35; Dolly Siding, Mo., $12.45; Martin, Millersville, Narlo, Clay Center, and Bettsville, O., Billmeyer, Plymouth Meeting, Pa., $13.

ORES

LAKE SUPERIOR IRON ORE

Gross ton, 51½% (natural), lower lake ports. After Jan. 25, 1950, increases or decreases, if any, in upper lake rail freight, dock handling charges and taxes thereon are for buyer's account.

Old range bessemer	$8.10
Old range nonbessemer	7.95
Mesabi bessemer	7.85
Mesabi nonbessemer	7.70
High phosphorus	7.70

EASTERN LOCAL ORE

Cents per unit, del. E. Pa.

Foundry and basic 56.62% concentrates contract	16.00

FOREIGN ORE

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 60 to 68%:	
Spot	17.00
Long-term contract	15.00
North African hematites	15.75
Brazilian iron ore, 68-69%	18.00

TUNGSTEN ORE

Net ton unit, duty paid

Chinese	$29.00-$30.00
Brazilian	29.00-30.00
Bolivian	29.00-30.00
Domestic scheelite, del.	32.00

MANGANESE ORE

Long term contracts, nominal; nearby, 48%, duty paid, 79.8c-81.8c per long ton unit, c.i.f. U. S. ports; prices on lower grades adjusted to manganese content and impurities.

CHROME ORE

Gross ton, f.o.b. cars, New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., or Tacoma, Wash.

Indian and African

48% 2.8:1	$32.50
48% 3:1	35.00-36.00
48% no ratio	26.00

South African Transvaal

44% no ratio	$17.00-18.00
45% no ratio	17.30-18.30
48% no ratio	26.00
50% no ratio	27.00-27.50

Brazilian

44% 2.5:1 lump	$32.00

Rhodesian

45% no ratio	$20.00-21.00
48% no ratio	26.00
48% 3:1 lump	35.00-36.00

Domestic—rail nearest seller

48% 3:1	$39.00

MOLYBDENUM

Sulphide concentrates per lb, molybdenum content, mines	$0.90

FERROALLOYS

MANGANESE ALLOYS

Spiegeleisen: (19-21% Mn, 1-3% Si), Carlot per gross ton, $65, Palmerton, Pa.; $66, Pittsburgh and Chicago; (16% to 19% Mn) $1 per ton lower.

Standard Ferromanganese: (Mn 78-82%, C7% approx.) Carload, lump, bulk $172 per gross ton of alloy, cl., packed, $184; gross ton lots, packed, $199; less gross ton lots, packed, $216; f.o.b. Alloy, W. Va., Niagara Falls, N. Y., or Welland, Ont. Base price: $174, f.o.b. Birmingham and Johnstown, Pa., furnaces, $172, Sheridan, Pa.; $175, Etna, Pa. Shipment from Pacific Coast warehouses by one seller add $33 to above prices, f.o.b. Los Angeles, San Francisco, Portland, Oreg. Shipment from Chicago warehouse, ton lots, $214; less gross ton lots, $231 f.o.b. Chicago. Add or subtract $2.15 for each 1% or fraction thereof, of contained manganese over 82% and under 78%, respectively.

Low-Carbon Ferromanganese, Regular Grade: (Mn 80-85%). Carload, lump, bulk, max. 0.10% C, 24.75c per lb of contained Mn, carload packed 25.5c, ton lot 26.6c, less ton 27.8c. Delivered. Deduct 0.5c for max. 0.15% C grade from above prices, 1c for max. 0.30% C, 1.5c for max. 0.50% C, and 4.5c for max. 75% C—max. 7% Si. **Special Grade:** (Mn 90% approx., C 0.07% max., P 0.06% max.). Add 0.5c to above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.5% max., Si 1.5% max.). Carload, lump, bulk 18.15c per lb of contained Mn, carload packed 18.9c, ton lot 20.0c, less ton 21.2c. Delivered. Spot, add 0.25c.

Manganese Metal, 2" x D (Mn 96% min., Fe 2% max., Si 1% max., C 0.2% max.): Carload lump bulk, 29c per lb of metal; packed, 29.75c; ton lot 31.25c; less ton lot 33.25c. Delivered. Spot, add 2c.

Manganese, Electrolytic: 250 lb to 1999 lb, 32c; 2000 to 39,999 lb, 30c; 40,000 lb or more, 28c. Premium for hydrogen-removed metal 1.5c per pound, f.o.b. cars Knoxville, Tenn. Freight allowed to St. Louis or to any point east of Mississippi.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk, 1.50% C grade, 18-20% Si, 8.95c per lb of alloy, carload packed, 9.70c, ton lot 10.60c, less ton 11.60c. Freight allowed. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. Spot, add 0.25c.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l., lump, bulk, 20.5c per lb of contained Cr. c.l., packed 21.4c, ton lot 22.55c, less ton 23.95c. Delivered. Spot, add 0.25c.

"SM" High-Carbon Ferrochrome: (Cr 60-65%, Si 4-6%, Mn 4-6%, C 4-6%). Add 1.1c to high-carbon ferrochrome prices.

(*Please turn to page* 154)

Metal Supplies Continue Tight

Advances of 1-cent a pound in lead, 2½ cents in zinc fail to lessen buying pressure. Split in copper market spreads to brass mill products. Tin drops below $1 level

New York—Zinc advanced 2½ cents a pound Sept. 7 to the basis of 17.50c, East St. Louis.

Demand for zinc continues extremely heavy with sellers distributing their offerings carefully. No improvement in the tight supply situation is being forecast over nearby months.

Rise of 1-cent in price of lead on Sept. 1 was fifth upward revision in seven weeks and brought the market to 14.80c, St. Louis. This is the highest level attained since Sept. 24, 1949, when the market was quoted ⅛-cent higher.

The latest advance failed to improve the demand-supply situation, since consumers continue to inquire for larger tonnages than are available. Business on the Commodity Exchange is being transacted at prices ranging around 15.25c.

Manufacturers of lead products, oxides and pigments posted higher prices for their products following the advance in the primary lead market.

Tin Prices Ease—The decline in tin prices which started during the final week in August continues. From a price of $1.045 on Aug. 26, Straits spot declined to 94.50c, a new low since the end of July but subsequently recovered to 99.00c. Consumers are showing very little buying interest and the offerings on all positions are in excess of demands.

Split Market in Copper—Additional producers have raised their prices to the basis of 24.50c, delivered Connecticut Valley, but two major producers have taken no action. Very little metal is available at the lower level, however, since one seller is practically sold out for September delivery and has not opened October books. Sellers who have opened October books are allocating tonnages to regular customers.

An unusually mixed price situation prevails in the copper products market. American Brass Co. advanced its prices 2 cents a pound Sept. 5 on copper products and advanced brass product prices proportionately. Bridgeport Brass Co. had previously issued a revised price schedule, effective as of Sept. 1, which shows prices generally below the American Brass list. Revere Copper & Brass Inc. raised prices, effective Sept. 7, on copper products two cents a pound with alloys advancing proportionately. Other brass mills have not as yet taken similar price action. Variance in scrap allowances is also noted.

General Cable Corp. announced that effective Sept. 7 certain price increases for size are being made. On weatherproof wire, the increases range from 1.95 cents to 3 cents a pound; on bare wire, 2.25 cents to 2.60 cents on wire 16 gage and heavier and 0.90 cents to 1.65 cents on 17 gage and lighter. No increase for size is made by the company with respect to magnet wire. The company made no change in its base prices.

Antimony prices advanced 4 cents a pound on Aug. 31.

Aluminum Silicate Deposit

Seattle—Gladding, McBean & Co., San Francisco, is developing a deposit of aluminum silicate near Lovelock, Nev., according to reports here. The company manufactures terra cotta, pipe, face brick, roof tile, etc.

Tighter Export Controls Pend

Washington—Tightening of export controls on nonferrous metals probably will be necessary to protect domestic supplies for anticipated defense and civilian requirements, officials of the Commerce Department told industry representatives here last week. Extension of export controls and imposition of export quotas is proposed. The industry group pointed out that undue restriction on exports of finished metals might have an adverse effect on the procurement of imported strategic raw materials needed for United States industrial production.

Apex Plans To Build Plant

Chicago—Apex Smelting Co., this city, is considering Helena, Ark., as a possible site for an aluminum producing plant. The company also is considering a site in the Grand river dam area near Oklahoma City, Okla. The company purchased the plant, equipment and inventories of National Smelting Co., Cleveland, in 1948 for $1.6 million and continues to operate the plant in that city.

Kaiser Expands Newark Mill

Newark, O.—Expansions and diversifications for the production of scores of additional products are being completed at the local plant of Kaiser Aluminum & Chemical Corp. A new Alloys Division has been added to the local plant to supply special alloy, ingot and billets to foundries, extrusion plants, and other nonintegrated fabricators.

Aluminum Output Rate Up

Washington — Domestic production of primary aluminum totaled 60,400 net tons in June, reports the Bureau of Mines. Although total output declined 2 per cent because of the shorter month, the average daily rate of production established a new peacetime record. Output came to 61,929 tons in May and 54,184 tons in June, 1949. Stocks at the end of June amounted to 14,500 tons compared with 16,341 tons at the end of May, 11,628 tons at the end of March and 28,165 tons at end of January.

Net imports decreased 35 per cent to 9251 tons in June as receipts from Canada declined for the third successive month. Imports of semi-crude aluminum from United Kingdom were also lower. Exports of sheets, plates, bars, etc. to the Philippines declined, but those to Palestine were greatly increased.

Output of aluminum ingot at secondary smelters increased 5 per cent to 13,029 net tons in May.

Bauxite Production Increases

Washington—Domestic mine production of bauxite increased to 359,938 long tons (dried equivalent) in the second quarter of this year, the greatest output for a three-month period since the end of 1948, reports the Bureau of Mines. Total production of Alabama and Georgia bauxite declined in the second quarter, as the American Cyanamid Co. ceased operation of its mines in the Andersonville, Ga., district.

Total imports of bauxite on an "as shipped" basis increased in the second quarter to 640,896 tons from 628,318 tons in the first quarter, despite a decline from Surinam, the largest foreign source. Receipts from both Indonesia and British Guiana gained, the former to a record high level. Exports to Canada decreased 5 per cent to 7566 tons.

STEEL'S Metal Price Averages for July, 1950

(Cents per pound)

Electrolytic Copper, del. Conn.	22.870
Lead, St. Louis	12.726
Prime, Western Zinc, E. St. Louis	15.000
Straits Tin, New York	102.120
Primary Aluminum Ingots, del.	17.500
Antimony, f.o.b. Laredo, Tex.	24.648
Nickel, f.o.b. refinery	48.000
Silver, New York	72.750

Castings Shipments Rise

Washington—Shipments of nonferrous castings in June, on an average working-day basis, were 4 per cent above May and 56 per cent above June, 1949, Bureau of the Census reports. Shipments, unadjusted for number of working days, totaled 171.3 million pounds in June compared with 164.4 million pounds in May and 109.5 million pounds in June, 1949. The June, 1950, total included 83 million pounds of copper castings, 37.6 million pounds of aluminum castings, 48.8 million pounds of zinc castings, 0.8 million pounds of magnesium castings, and 1.1 million pounds of lead die castings.

Unfilled orders at the end of June for these nonferrous castings amounted to 145.7 million pounds, 4.4 million pounds above May and 40.5 million pounds above the total at the end of June, 1949.

NONFERROUS METALS

(Cents per pound, carlots, except as otherwise noted)

Primary Metals

Copper: Electrolytic 22.50-24.50c, Conn. Valley; Lake 24.62½c, delivered.

Brass Ingot: 85-5-5-5 (No. 115) 25.50c; 88-10-2 (No. 215) 35.00c; 80-10-10 (No. 305) 29.50c; No. 1 yellow (No. 405) 21.75c.

Zinc: Prime western 17.50c; brass special 17.75c; intermediate 18.00c, East St. Louis; high grade 16.10-17.60c delivered.

Lead: Common 14.80c; chemical 14.90c; corroding 14.90c, St. Louis.

Primary Aluminum: 99% plus, ingots 17.50c, pigs 16.50c. Base prices for 10,000 lb and over. Freight allowed on 500 lb or more but not in excess of rate applicable on 30,000 lb c.l. orders.

Secondary Aluminum: Piston alloys 24.50-24.75c; No. 12 foundry alloy (No. 2 grade) 24.00c; steel deoxidizing grades, notch bars, granulated or shot; Grade 1, 25.00c; grade 2 24.00-24.50c; grade 3, 23.25-23.50; grade 4, 23.00c. Prices include freight at carload rate up to 75 cents per 100 lb.

Magnesium: Commercially pure (99.8%) standard ingots, 10,000 lb and over 22.50c, f.o.b. Freeport, Tex.

Tin: Grade A, prompt and September 99.00c, October 98.50c, November 98.00c.

Antimony: American 99-99.8% and over but not meeting specifications below 98.50c; 99.8% and over (arsenic 0.05% max.; other impurities 0.1% max.) 29.00c; f.o.b. Laredo, Tex., for bulk shipments. Foreign, 99%; Chinese nom.; English, nom.; Belgian, 28.50c, duty paid, New York.

Nickel: Electrolytic cathodes, 99.9%, base sizes at refinery, unpacked, 48.00c; 25-lb pigs, 50.50c; "XX" nickel shot, 51.50c; "F" nickel shot or ingots, for addition to cast iron, 48.50c. Prices include import duty.

Mercury: Open market, spot, New York $77-$80 per 76-lb flask.

Beryllium-Copper: 3.75-4.25% Be, $30.00 per lb contained Be, f.o.b., Cleveland and Reading, Pa.

Cadmium: "Regular" straight or flat forms, $2.15 del.; special or patented shapes, $2.30.

Cobalt: 97-99%, $1.80 per lb for 500 lb (keg); $1.82 per lb for 100 lb (case); $1.87 per lb under 100 lb.

Gold: U. S. Treasury, $35 per ounce.

Silver: Open market, New York, 72.75c per oz.

Platinum: $87-$90 per ounce from refiners.

Palladium: $24 per troy ounce.

Iridium: $220 per troy ounce.

Titanium (sponge form): $5 per pound.

Rolled, Drawn, Extruded Products

COPPER AND BRASS

(Base prices, cents per pound, f.o.b. mill; based on 22.50-cent copper.)

Sheet: Copper 37.43; yellow brass 34.19; commercial bronze, 95%, 37.38; 90%, 36.93; red brass, 85% 35.96; 80%, 35.52; best quality, 35.04; nickel silver, 18%, 48.39; phosphor-bronze, grade A, 5% 55.11.

Rods: Copper, hot-rolled 33.28; cold-drawn 34.53; yellow brass free cutting, 28.54; commercial bronze, 95% 37.07; 90% 36.62; red brass 85% 35.65; 80% 35.21.

Seamless Tubing: Copper 37.47; yellow brass 37.20; commercial bronze 90% 39.59; red brass 85% 38.87; 80% 38.43.

Wire: Yellow brass 34.48; commercial bronze, 95% 37.67; 90% 37.22; red brass, 85% 36.25; 80% 35.81; best quality brass 35.33.

Copper Wire: Bare, soft, f.o.b. eastern mills, c.l. 26.67, l.c.l. 27.17, 100,000 lb lots 26.545; weatherproof, f.o.b. eastern mills, c.l. 28.10, l.c.l. 28.60, 100,000 lb lots 27.85; magnet, del., 15,000 lb or more 32.50, l.c.l. 33.25.

ALUMINUM

(30,000 lb base; freight allowed on 500 lb or more, but not in excess of rate applicable on 30,000 lb c.l. orders.

Sheets and Circles: 2S and 3S mill finish c.l.

Thickness Range, Inches	Widths or Diameters, In., Incl.	Flat Sheet Base*	Coiled Sheet Base	Coiled Sheet Circle† Base
0.249-0.136	12-48	27.4	...	...
0.135-0.096	12-48	27.9	...	...
0.095-0.077	12-48	28.4	26.5	30.1
0.076-0.061	12-48	29.0	26.7	30.3
0.060-0.048	12-48	29.2	26.9	30.6
0.047-0.038	12-48	29.6	27.1	30.9
0.037-0.030	12-48	30.0	27.5	31.4
0.029-0.024	12-48	30.4	27.8	31.8
0.023-0.019	12-36	31.0	28.2	32.3
0.018-0.017	12-36	31.6	28.8	33.1
0.016-0.015	12-36	32.3	29.4	34.0
0.014	12-24	33.2	30.2	35.1
0.013-0.012	12-24	34.1	30.9	36.0
0.011	12-24	35.1	31.8	37.2
0.010-0.0095	12-24	36.1	32.8	38.5
0.009-0.0085	12-24	37.3	33.9	40.0
0.008-0.0075	12-24	38.6	35.1	41.6
0.007	12-18	40.0	36.4	43.4
0.006	12-18	41.5	37.7	47.5

* Minimum length, 60 inches. † Maximum diameter, 24 inches.

Screw Machine Stock: 5000 lb and over.

Diam. (in.) or distance across flats	—Round— R317-T4, 17S-T4	——Hexagonal—— R317-T4	17S-T4
0.125	48.5	....	....
0.156-0.203	41.5	....	....
0.219-0.313	38.5	....	....
0.344	37.5	....	47.5
0.375	37.0	46.0	44.5
0.406	37.0	....	....
0.438	37.0	46.0	44.5
0.469	37.0	....	....
0.500	37.0	46.0	44.5
0.531	37.0	....	....
0.563	37.0	....	42.0
0.594	37.0	....	....
0.625	37.0	43.5	42.0
0.656	37.0	....	....
0.688	37.0	....	42.0
0.750-1.000	36.0	41.0	39.5
1.063	36.0	....	38.0
1.125-1.500	35.0	39.5	38.0
1.563	35.0	....	37.0
1.625	34.0	....	37.0
1.688-2.000	34.0	....	....

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh) Sheets: Full rolls, 140 sq ft or more $20.00 per cwt; add 50c cwt, 10 sq ft to 140 sq ft. Pipe: Full coils $20.00 per cwt. Traps and bends: List prices plus 58%.

ZINC

Sheets, 23.25c, f.o.b. mill, 36,000 lb and over. Ribbon zinc in coils, 22.50c, f.o.b. mill, 36,000 lb and over. Plates, not over 12-in., 21.50c; over 12-in., 22.50c.

"A" NICKEL

(Base prices f.o.b. mill)

Sheets, cold-rolled, 69.00c. Strip, cold-rolled, 75.00c. Rods and shapes, 65.00c. Plates, 67.00c. Seamless tubes, 98.00c.

MONEL

(Base prices, f.o.b. mill)

Sheets, cold-rolled 53.00c. Strip cold-rolled 56.00c. Rods and shapes, 51.00c. Plates, 52.00c. Seamless tubes, 86.00c. Shot and blocks, 46.00c.

MAGNESIUM

Extruded Rounds, 12 in. long, 1.31 in. in diameter, less than 25 lb. 55.00-59.00c; 25 to 99 lb. 45.00-49.00c; 100 lb to 5000 lb, 38.00c.

Plating Materials

Chromic Acid: 99.9% flake, f.o.b. Philadelphia, carloads, 25.50c; 5 tons and over 26.00c; 1 to 5 tons, 26.50c; less than 1 ton 27.00c.

Copper Anodes: Base 2000 to 5000 lb; f.o.b. shipping point, freight allowed; Flat untrimmed 34.09c; oval 33.59c; cast 32.12c.

Copper Cyanide: 70-71% Cu, 100-lb drums, 1000 lb 51.40c, under 1000 lb 49.40c, f.o.b. Niagara Falls, N. Y.

Sodium Cyanide: 96-98%, ½-oz ball, in 200 lb drums, 1 to 900 lb, 18.00c; 1000 to 19,000 lb, 17.00c, f.o.b. Niagara Falls, N. Y. Packaged in 100 lb drums add ½-cent.

Copper Carbonate: 54-56% metallic Cu; 50 lb bags, up to 200 lb, 28.00c; over 200 lb, 27.00c, f.o.b. Cleveland.

Nickel Anodes: Rolled oval, carbonized, carloads, 65.00c; 10,000 to 30,000 lb, 63.00c; 3000 to 10,000 lb, 67.00c, 500 to 3000 lb, 68.00c; 100 to 500 lb, 70.00c; under 100 lb, 73.00c; f.o.b. Cleveland.

Nickel Chloride: 100-lb kegs, 29.50c; 400-lb bbl. 27.50c up to 10,000 lb, 27.00c over 10,000 lb, f.o.b. Cleveland, freight allowed on barrels, or 4 or more kegs.

Tin Anodes: Bar, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; ball, 1000 lb and over, nom.; 500 to 999 lb, nom.; 200 to 499 lb, nom.; less than 200 lb, nom.; f.o.b. Sewaren, N. J.

Sodium Stannate: 25 lb cans only, less than 100 lb, to consumers nom.; 100 or 300 lb drums only, 100 to 500 lb, nom.; 600 to 1900 lb, nom.; 2000 to 9900 lb, nom.; f.o.b. Sewaren, N. J. Freight not exceeding St. Louis rate allowed.

Zinc Cyanide: 100 lb drums, less than 10 drums 44.6c, 10 or more drums 42.6c, f.o.b. Niagara Falls, N. Y.; 45.85c and 43.85c, respectively, del. Cleveland or Philadelphia.

Stannous Sulphate: 100 lb kegs or 400 lb bbl, less than 2000 lb nom.; more than 2000 lb, nom., f.o.b. Carteret, N. J.

Stannous Chloride (Anhydrous): In 400 lb bbl, nom.; 100 lb kegs nom., f.o.b. Carteret, N. J.

Scrap Metals

BRASS MILL ALLOWANCES

Prices in cents per pound for less than 15,000 lb, f.o.b. shipping point.

	Heavy Clean	Ends Rod	Turnings Clean
Copper	21.50	21.50	20.75
Yellow Brass	18.125	17.875	16.75
Commercial Bronze			
95%	20.375	20.125	19.625
90%	20.125	19.875	19.375
Red brass			
85%	19.875	19.625	19.125
80%	19.50	19.25	18.75
Muntz metal	16.875	16.625	16.125
Nickel, silver, 10%	20.50	20.25	10.25
Phos. bronze, A	21.625	21.375	10.81¼

BRASS INGOT MAKERS' BUYING PRICES

(Cents per pound, delivered eastern refineries, carload lots)

No. 1 copper 21.75; No. 2 copper 20.75; light copper 19.75; composition red brass 18.75-19.00; radiators 15.00; heavy yellow brass 14.25-14.50.

REFINERS' BUYING PRICES

(Cents per pound, delivered refinery, carload lots)

No. 1 copper 21.75; No. 2 copper 20.75; light copper 19.75; refinery brass (60% copper) per dry copper content 20.00.

DEALERS' BUYING PRICES

(Cents per pound, New York, in ton lots)

Copper and brass: Heavy copper and wire, No. 1 19.75-20.00; No. 2 18.50-18.75; light copper 17.50-17.75; No. 1 composition red brass 16.25-16.50; No. 1 composition turnings 15.75-16.25; mixed brass turnings 10.25-10.50; new brass clippings 17.12½-17.37½; No. 1 brass rod turnings 15.25-15.50; light brass 10.00-10.25; heavy yellow brass 11.75-12.00; new brass rod ends 15.50-15.75; auto radiators, unsweated 12.50-12.75; cocks and faucets, 14.50-14.75; brass pipe 15.50-15.75.

Lead: Heavy 12.50-12.75; battery plates 7.25-7.50; linotype and stereotype 14.00-14.25; electrotype 12.25-12.50; mixed babbitt 11.75-12.00.

Zinc: Old zinc 8.50-8.75; new die cast scrap 8.25-8.50; old die cast scrap 5.50-5.75.

Tin: No. 1 pewter 55.00-57.00; block tin pipe 75.00-77.00; No. 1 babbitt 50.00-52.00.

Aluminum: Clippings 2S 13.00; old sheets 10.00; crankcase 10.00; borings and turnings 6.50.

DAILY PRICE RECORD

1950	Copper	Lead	Zinc	Tin	Aluminum	Antimony	Nickel	Silver
Sept. 7	22.50-24.50	14.80	17.50	99.00	17.50	28.50	48.00	72.75
Sept. 6	22.50-24.50	14.80	15.00	97.00	17.50	28.50	48.00	72.75
Sept. 5	22.50-24.50	14.80	15.00	95.50	17.50	28.50	48.00	72.75
Sept. 1-2	22.50-24.50	14.80	15.00	97.50	17.50	28.50	48.00	72.75
Aug. Avg.	22.870	12.726	15.00	102.12	17.50	24.648	48.00	72.75
Aug. 31	22.50-24.50	13.80	15.00	98.50	17.50	28.50	48.00	72.75
Aug. 30	22.50-24.50	13.80	15.00	99.50	17.50	24.50	48.00	72.75
Aug. 28-29	22.50-24.50	13.80	15.00	102.00	17.50	24.50	48.00	72.75
Aug. 25-26	22.50-24.50	13.80	15.00	104.50	17.50	24.50	48.00	72.75
Aug. 24	22.50-24.50	13.80	15.00	104.00	17.50	24.50	48.00	72.75
Aug. 23	22.50-24.50	13.80	15.00	102.50	17.50	24.50	48.00	72.75
Aug. 22	22.50-24.50	13.80	15.00	106.00	17.50	24.50	48.00	72.75
Aug. 21	22.50-24.50	13.80	15.00	107.75	17.50	24.50	48.00	72.75
Aug. 18-19	22.50	12.80	15.00	102.00	17.50	24.50	48.00	72.75
Aug. 17	22.50	12.80	15.00	101.00	17.50	24.50	48.00	72.75
Aug. 16	22.50	12.80	15.00	105.00	17.50	24.50	48.00	72.75
Aug. 15	22.50	12.80	15.00	107.50	17.50	24.50	48.00	72.75

NOTE: Copper: Electrolytic, del. Conn. Valley; Lead, common grade, del. St. Louis; Zinc, prime western, E. St. Louis; Tin, Straits, del. New York; Aluminum primary ingots, 99%, del.; Antimony, bulk, f.o.b. Laredo, Tex.; Nickel, electrolytic cathodes, 99.9%, base sizes at refinery unpacked; Silver, open market, New York. Prices, cents per pound; except silver, cents per ounce.

IRON AND STEEL SCRAP

Consumer prices, except as otherwise noted, including brokers commissions, as reported to STEEL, Sept. 7, 1950; gross tons
Changes shown in italics.

STEELMAKING SCRAP COMPOSITE

Sept. 7	$41.08
Aug. 31	40.92
Aug. 1950	40.00
Sept. 1949	26.07
Sept. 1945	19.17

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 Heavy Melt.	$44.00
No. 2 Heavy Melt.	*41.00*
No. 1 Busheling	44.00
No. 1 Bundles	44.00
No. 2 Bundles	*39.00*
Heavy Turnings	43.00-44.00
Machine Shop Turnings	34.00-35.00†
Mixed Borings, Turnings	34.00-35.00†
Short Shovel Turnings	36.50-37.00
Cast Iron Borings	*35.50-36.00*
Low Phos. Steel	50.00-51.00

Cast Iron Grades

No. 1 Cupola Cast	44.00-45.00
No. 1 Machinery Cast	50.00-51.00
Charging Box Cast	43.00-44.00
Heavy Breakable Cast	41.00-42.00

Railroad Scrap*

No. 1 R.R. Heavy Melt.	*45.00-46.00*
Rails, Random Lengths	48.50-49.00
Rails, 2 ft. and under	52.00-52.50
Rails, 18 in. and under	52.50-53.00
Railroad Specialties	52.00-52.50

* Nominal.
* Brokers' buying price.
† Crushers' buying prices.

CLEVELAND

No. 1 Heavy Melt. Steel	*$41.00-41.50*
No. 2 Heavy Melt. Steel	38.50-39.00
No. 1 Busheling	*41.00-41.50*
No. 1 Bundles	*41.00-41.50*
No. 2 Bundles	31.00-32.00
Machine Shop Turnings	29.50-30.00
Mixed Borings, Turnings	33.00-33.50
Short Shovel Turnings	33.00-33.50
Cast Iron Borings	33.00-33.50
Low Phos.	44.00-44.50

Cast Iron Grades

No. 1 Cupola	49.00-50.00
Charging Box Cast	44.00-45.00
Stove Plate	43.00-44.00
Heavy Breakable Cast	41.00-42.00
Unstripped Motor Blocks	35.00-36.00
Brake Shoes	39.00-40.00
Clean Auto Cast	50.00-51.00
No. 1 Wheels	44.00-45.00
Burnt Cast	39.00-40.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	46.00-46.50
R.R. Malleable	49.00-50.00
Rails, 3 ft and under	53.00-54.00
Rails, 18 in. and under	55.00-56.00
Rails, Random Lengths	50.00-51.00
Cast Steel	48.00-49.00
Railroad Specialties	49.00-50.00
Uncut Tires	50.00-51.00
Angles, Splice Bars	51.00-51.50

VALLEY

No. 1 Heavy Melt. Steel	$43.50-44.00
No. 2 Heavy Melt. Steel	39.50-40.00
No. 1 Bundles	46.00-46.50
Facty. Prod. Bundles	47.00-47.50
No. 2 Bundles	34.00-34.50
Machine Shop Turnings	34.00-34.50
Short Shovel Turnings	36.00-36.50
Cast Iron Borings	36.00-36.50
Low Phos.	46.50-47.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	47.00-47.50

PHILADELPHIA

No. 1 Heavy Melt. Steel	*$39.00-39.50*
No. 2 Heavy Melt. Steel	36.00
No. 1 Busheling	*38.00*
No. 1 Bundles	*39.00-39.50*
No. 2 Bundles	31.00-32.00
Machine Shop Turnings	30.00
Short Shovel Turnings	*33.00*
Mixed Borings, Turnings	28.00-28.50
Low Phos. Punchings and Plate, elec. fur. grade	46.00
Low Phos. Plate, 5 ft & Under	45.00
Elec. Furnace Bundles	40.00-41.00
Heavy Turnings	*39.00*
No. 1 Chemical Borings	39.00
Knuckles and couplers	*45.00-46.00*
Steel car wheels	*45.00-46.00*

Cast Iron Grades

No. 1 Cupola Cast	38.50-39.00
No. 1 Machinery Cast	*43.00-44.00*
No. 1 Yard Cast	37.00-37.50
Charging Box Cast	38.00-39.00
Heavy Breakable Cast	38.00-39.00
Clean Auto Cast	*43.00-44.00*
No. 1 Wheels	46.00-47.00
Malleable	*50.00-51.00*

CINCINNATI

No. 1 Heavy Melt. Steel	*$41.00*
No. 2 Heavy Melt. Steel	*35.00*
No. 1 Busheling	*41.00*
No. 1 Bundles	*41.00*
No. 2 Black Bundles	*35.00*
No. 3 Bundles	28.00
Machine Shop Turnings	25.00
Short Shovel Turnings	28.00
Mixed Borings, Turnings	27.00
Cast Iron Borings	28.00

Cast Iron Grades

No. 1 Cupola Cast	51.00
Charging Box Cast	42.00
Stove Plate	35.00
Heavy Breakable Cast	42.00
Unstripped Motor Blocks	32.00
Brake Shoes	30.00
Clean Auto Cast	51.00
Drop Broken Cast	53.00
Low Phos., 18 in. and under	52.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*43.00*
R.R. Malleable	46.00
Rails, Rerolling	*50.00*
Rails, Random Lengths	47.00
Rails, 18 in. and under	55.00

DETROIT

(Brokers' buying prices, f.o.b. shipping point)

No. 2 Heavy Melt. Steel	$30.00-31.00
No. 1 Bundles	*38.50*
No. 2 Bundles	29.00-30.00
No. 1 Busheling	38.00-39.00
Machine Shop Turnings	25.00-26.00
Forge Flashings	37.00-38.00
Short Shovel Turnings	29.00-30.00
Cast Iron Borings	29.00-30.00
Punchings & Plate Scrap	40.00-41.00

Cast Iron Grades

No. 1 Cupola Cast	42.00-43.00
Heavy Breakable Cast	35.00-36.00
Clean Auto Cast	45.00-46.00

BUFFALO

No. 1 Heavy Melt. Steel	$39.50-40.00
No. 2 Heavy Melt. Steel	36.00-36.50
No. 1 Busheling	36.00-36.50
No. 1 Bundles	37.00-37.50
No. 2 Bundles	34.00-34.50
Machine Shop Turnings	30.00-30.50
Mixed Borings, Turnings	30.00-30.50
Cast Iron Borings	30.00-30.50
Short Shovelings	32.00-32.50
Low Phos.	41.50-42.00

Cast Iron Grades

No. 1 Cupola	38.50-39.00
No. 1 Machinery	41.00-42.00
Malleable	36.00-37.00

Railroad Scrap

Rails, 2 ft. and under	49.00-50.00
Rails, random size	44.00-45.00
Railroad Specialties	42.00-43.00

NEW YORK

(Brokers' buying prices f.o.b. shipping point)

No. 1 Heavy Melt. Steel	$33.00-34.00
No. 2 Heavy Melt. Steel	28.00-29.00
No. 1 Busheling	29.00-30.00
No. 1 Bundles	33.00-34.00
No. 2 Bundles	27.00-28.00
Machine Shop Turnings	23.00-24.00
Mixed Borings, Turnings	22.00-23.00
Short Shovel Turnings	25.00
Punchings & Plate Scrap	36.00-37.00
Low Phos. Plate, 5 ft & under	36.00-37.00
Elec. Furnace Bundles	35.00-36.00

Cast Iron Grades

No. 1 Cupola Cast	*33.00-34.00*
No. 1 Machinery	*35.00-36.00*
Charging Box Cast	30.00-31.00
Heavy Breakable	30.00-31.00
Unstripped Motor Blocks	23.00-24.00

BOSTON

(F.o.b. shipping point)

No. 1 Heavy Melt. Steel	*$32.00*
No. 2 Heavy Melt. Steel	*25.00-25.50*
No. 1 Bundles	*32.00*
No. 1 Busheling	*31.00-32.00*
Machine Shop Turnings	23.00-23.50
Short Shovel Turnings	25.00-25.50
Mixed Borings, Turnings	*24.00-24.50*
Bar Crops and Plate	37.00-38.00
Punchings & Plate Scrap	37.00-38.00
Chemical Borings	29.00-30.00

Cast Iron Grades

No. 1 Cupola Cast	31.00-32.00
Mixed Cast	30.00-31.00
Heavy Breakable Cast	28.50-29.00
Stove Plate	29.00-30.00

CHICAGO

No. 1 Heavy Melt. Steel	*$40.00*
No. 2 Heavy Melt. Steel	*38.00*
No. 1 Bundles	*40.00*
No. 2 Bundles	*34.00*
Machine Shop Turnings	*26.00**-*27.00**
Mixed Borings, Turnings	*26.00-27.00**
Short Shovel Turnings	*28.00*
Cast Iron Borings	*28.00-30.00*
Low Phos.	*50.00-52.50*
Elec. Furnace Bundles	41.00-42.00
Heavy Turnings	35.00-36.00
Cut Structurals	44.00-45.00

Cast Iron Grades

No. 1 Cupola Cast	49.00-50.00
Clean Auto Cast	49.50-50.50
No. 1 Wheels	41.00-42.00
Stove Plate	41.00-42.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	*41.50-42.00*
Malleable	53.00-54.00
Rails, Rerolling	59.00-60.00
Rails, Random Lengths	*54.00-55.00*
Rails, 2 ft and under	59.00-60.00
Rails, 18 in. and under	60.00-61.00
Railroad Specialties	49.00-50.00
Angles, Splice Bars	53.00-54.00

* Nominal.
† Brokers' buying prices.

BIRMINGHAM

No. 1 Heavy Melt. Steel	$33.00-34.00
No. 2 Heavy Melt. Steel	29.00-30.00
No. 1 Busheling	29.00-30.00
No. 2 Bundles	27.00-28.00
Machine Shop Turnings	27.00-28.00
Mixed Borings, Turnings	23.00-24.00
Short Shovel Turnings	27.00-28.00
Cast Iron Borings	27.00-28.00
Bar Crops and Plate	41.00-42.00
Cut Structurals	41.00-42.00

Cast Iron Grades

No. 1 Cupola Cast	43.00-44.00
Stove Plate	37.00-38.00
No. 1 Wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	37.50-38.00
R.R. Malleable	nominal
Rails, Rerolling	48.00-49.00
Rails, 3 ft and under	48.00-49.00
Angles and Spice Bars	47.00-48.00

ST. LOUIS

No. 1 Heavy Melt. Steel	$40.00-41.00
No. 2 Heavy Melt. Steel	*34.00-35.00*
No. 1 Bundles	39.00-40.00
No. 2 Bundles	*34.00-35.00*
Machine Shop Turnings	*29.00-31.00*
Short Shovel Turnings	30.00-31.00

Cast Iron Grades

No. 1 Cupola Cast	45.00-46.00
Charging Box Cast	40.00-42.00
Heavy Breakable Cast	40.00-41.00
Brake Shoes	*44.00-45.00*
Clean Auto Cast	42.00-44.00
Burnt Cast	38.00-39.00

Railroad Scrap

R.R. Malleable	53.00-55.00
Rails, Rerolling	57.00-58.00
Rails, Random Lengths	51.00-53.00
Rails, 2 ft and under	56.00-58.00
Uncut Tires	50.00-51.00
Angles, Splice Bars	53.00-54.00
Railroad Specialties	*49.00-50.00*

SAN FRANCISCO

No. 1 Heavy Melt. Steel	$22.00
No. 2 Heavy Melt. Steel	20.00
No. 1 Bundles	18.00
No. 2 Bundles	17.00
No. 3 Bundles	15.00
Machine Shop Turnings	9.00

Cast Iron Grades

No. 1 Cupola Cast	32.00-34.00

Railroad Scrap

No. 1 R.R. Heavy Melt.	22.00
Rails, Random Lengths	22.00

SEATTLE

No. 1 Heavy Melt. Steel	$24.00
No. 2 Heavy Melt. Steel	24.00
No. 1 Busheling	21.50
Nos. 1 & 2 Bundles	22.00
No. 3 Bundles	18.00
Machine Shop Turnings	15.00
Mixed Borings, Turnings	15.00
Punchings & Plate Scrap	30.00-32.50
Cut Structurals	30.00-32.50

Cast Iron Grades

No. 1 Cupola Cast	30.00-35.00
Heavy Breakable Cast	30.00
Stove Plate	25.00-27.50
Unstripped Motor Blocks	30.00
Malleable	30.00
Brake Shoes	30.00
Clean Auto Cast	35.00
No. 1 Wheels	32.50

Railroad Scrap

No. 1 R.R. Heavy Melt	25.00
Railroad Malleable	30.00
Rails, Random Lengths	26.00
Angles and Splice Bars	25.00

LOS ANGELES

(F.o.b. car, Los Angeles)

No. 1 Heavy Melt. Steel	$23.50
No. 2 Heavy Melt. Steel	21.50
Nos. 1 & 2 Bundles	*19.50*
*No. 3 Bundles**	*16.50*
Machine Shop Turnings	*12.00*
Mixed Borings, Turnings	8.00
Punchings & Plate Scrap	*44.50*

Cast Iron Grades

No. 1 Cupola Cast	*42.80*

Railroad Scrap

No. 1 R.R. Heavy Melt.	23.50
Rails, Rerolling	39.50

HAMILTON, ONT.

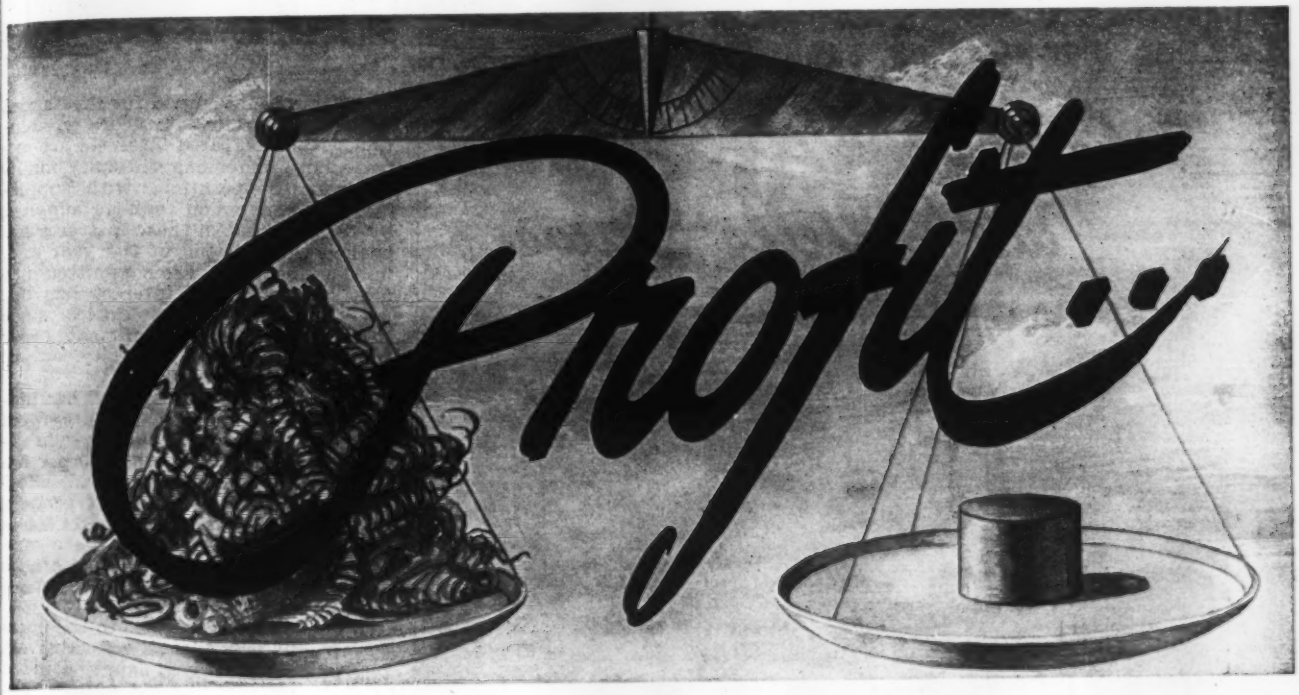
(Delivered prices)

Heavy Melt.	$30.00
No. 1 Bundles	30.00
Mechanical Bundles	28.00
Mixed Steel Scrap	28.00
Mixed Borings, Turnings	23.00
Rails, Remelting	30.00
Rails, Rerolling	33.00
Busheling	24.50
Bushelings new factory, prep'd	28.00
Bushelings new factory, unprep'd	23.00
Short Steel Turnings	23.00

Cast Iron Grades

Cast	40.00-43.00*

* F.o.b. shipping point.



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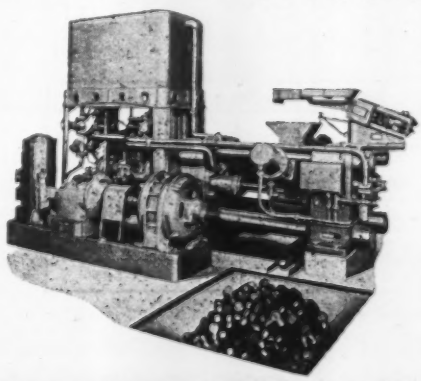
Balance between ***profit*** and ***loss*** in the reclamation of scrap lies in a MILWAUKEE Hydraulic Briquetting Press. Cast iron, steel, brass, magnesium, bronze, and aluminum turnings, borings, and chips can be converted into compact, uniform, solid cylindrical blocks quickly and easily with little or no loss. These briquettes, identical in size and weight, reduce scrap handling and storage problems to a minimum. Classified as high-grade scrap, briquettes can be charged into furnace or cupola more readily and with greater economy than loose scrap.

Leading manufacturers of automobiles, heavy-duty mobile equipment, farm implements, aircraft, plumbing supplies, auto parts, pumps, and other high-production products currently are briquetting their scrap profitably. Many have increased self-sufficiency by reducing their dependence on outside scrap sources.

Of primary importance, also, is the fact that many of these plants have written off the *entire cost* of a MILWAUKEE Briquetting Press in one year or less. Write today for BULLETIN No. 117 to obtain complete specifications on available sizes of MILWAUKEE Briquetting Presses.



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MILWAUKEE *Foundry Equipment Division*

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On cut-off jobs . . .

You benefit 4 ways with Wells Saws

1. Fast, continuous cutting action.
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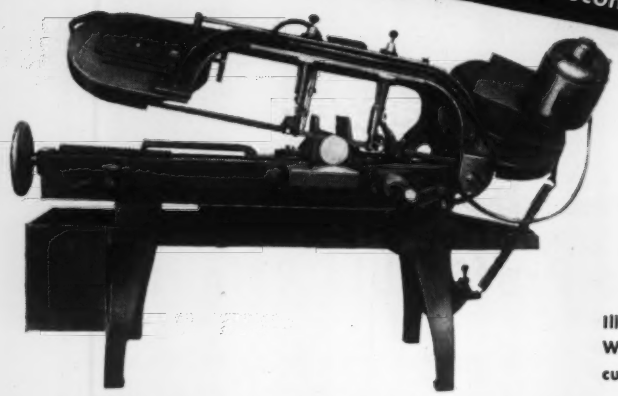
4. Greater overall economy.



Illustrated is the popular Wells No. 8 with wet cutting system.

Our 25th year of service

HORIZONTAL band sawing is the modern, cost-cutting way to handle cut-off jobs . . . and Wells Saws are the leaders among horizontal metal cutting band saw machines. Simplicity of design means fewer moving parts and easy operation. Ruggedly built to increase productivity and reduce cutting costs, a Wells Saw pays for itself quickly and will give you years and years of dependable, satisfactory service.

BIG JOBS or LITTLE Jobs . . . There's a "WELLSAW" to meet your Metal Cutting Requirements. Check the table below and write for complete descriptive information or a job demonstration.

MODEL	49 A	No. 5	No. 8	No. 12
Capacity in inches: Rounds Rectangular	3½ 3½ x 6	5 5 x 10	8 8 x 16	12¾ 12 x 16
Blade speeds, ft. per min.	54, 100, 190	60, 90, 130	60, 90, 130	50, 100, 150
Motor Size	1/6 H.P.	⅓ H.P.	½ H.P.	¾ H.P.
Floor Space, in inches	16½ x 38	21 x 50	24 x 72	32 x 78
Wet cutting system	No	Yes	Yes	Yes

Automatic stock projection available for Nos. 8 and 12.

Wells saws

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Products by Wells are Practical

METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION
1515 FILLMORE ST., THREE RIVERS, MICHIGAN

Sheets, Strip . . .

Sheets and Strip Prices, Page 135 & 136

Pittsburgh—Demand for sheets and strip exceeds current record production. Nonintegrated interests are experiencing increasing difficulty maintaining full operations with supplementary conversion tonnage supplied by customers. All these interests are booked through end of the year and, in some instances, are committed into first quarter. One interest has not accepted silicon steel orders since Aug. 1 because of sufficient order backlog to sustain capacity output through fourth quarter.

Due to increased costs of semifinished steel, another nonintegrated producer advanced dynamo grade silicon sheets in cut lengths $50 per ton from 8.75c to 11.25c a pound, effective Sept. 1; transformer 72 grade a like amount from 9.30c to 11.80c a pound. This interest has been supplying electrical and motor grades for some time at the dynamo price level.

No customer resistance to the higher prices is in evidence, reflecting extent of the unbalanced supply-demand relationship existing not only in silicon but in all flat-rolled steel items.

Greater interest is noted in conversion tonnage, with some metalworking concerns making commitments six to nine months ahead at prices up to $150 a ton for hot-rolled strip and sheets and $225 on cold-rolled. High scrap prices account in part for higher prices paid on conversion tonnage.

Cleveland—Stringency in sheet and strip supply is getting worse. With the mills booked up through remainder of the year consumers are having a difficult time getting all the tonnage they will need to care for business already on their books. Fourth quarter mill allotments have been cut severely and further cuts may be made to care for military requirements. Carryover tonnage from third quarter will take a substantial part of fourth quarter production. Even the conversion and gray markets provide little encouragement to consumers since there is little conversion rolling capacity open and tonnage available in the gray market is relatively small.

Boston—Heavy buying of stainless, notably strip, has filled some mills for the balance of the year. While scheduling has moved deeper into fourth quarter, some flexible openings are held for armament tonnage, appearing in heavier volume.

New York—A leading seller of stainless sheets and strip opened books for first quarter. Most others, virtually out of the market for remainder of this year, are likely soon to take similar action on these specialties. Producers of carbon and silicon sheets are sold out for final quarter but give no indications they will take early action for first quarter. Some are making allowances for a certain percentage of defense work for remainder of the year, but most appear to have filled their schedules with the idea of cutting civilian requirements should emergency needs dictate such action.

Buffalo — Production of cold-rolled strip was slashed drastically here last week as 900 workers at Bethle-

hem's Lackawanna mill walked out over a grievance on piece rates. The hot mill has been closed temporarily for an expansion program.

Philadelphia — While gray market activities in sheets have not reached the volume of two or three years ago, they are evident, and leading producers of sheets are tightening their grip on tonnage leaving their plants.

Cincinnati — Sheet mills are not ready to announce fourth quarter allotments because of uncertainty as to essential government needs. Scheduling of tonnage for military needs, which are increasingly heavy, has augmented considerably the carryover into fourth quarter.

Chicago—Assurances that government requirements will remain comparatively small offer sheet consumers small consolation. Fourth quarter carryovers have written off several weeks' production in October and each new defense order bites a little deeper into customers' quotas. Mills seek to have defense contract holders cover their needs out of their existing allotments.

Here is one dodge being successfully worked: A metalworking plant obtains a government contract requiring a different steel product than that normally used. Mills feel compelled to schedule the steel for the government order, but do not subtract the tonnage from the consumer's regular civilian quota. For the time being this is allowing some companies to expand overall operations.

Two prices continue quoted on cold-rolled strip here. The 4.50c price quoted by two producers has not been universally followed, and there are no indications changes pend.

St. Louis—Demand for cold-rolled sheets picks up steadily. Deliveries are four to six weeks late and losing ground each month. Granite City Steel Co. will not allocate its full production in fourth quarter in order to reduce arrearages. No large government orders have dislocated schedules.

Birmingham — Producers are emphasizing production of sheets, but they are making little headway in reducing order backlogs. Customers want more sheet tonnage, but mills are trying to shave quotas.

Los Angeles — Sheet producers' books are filled with tonnage on allocation to regular customers. Gray market brokers offer cold-rolled sheets at 13 cents per pound; say they paid 10 cents per pound. Military orders are heavier. Backlog of Lockheed Aircraft Corp. stands at $431 million.

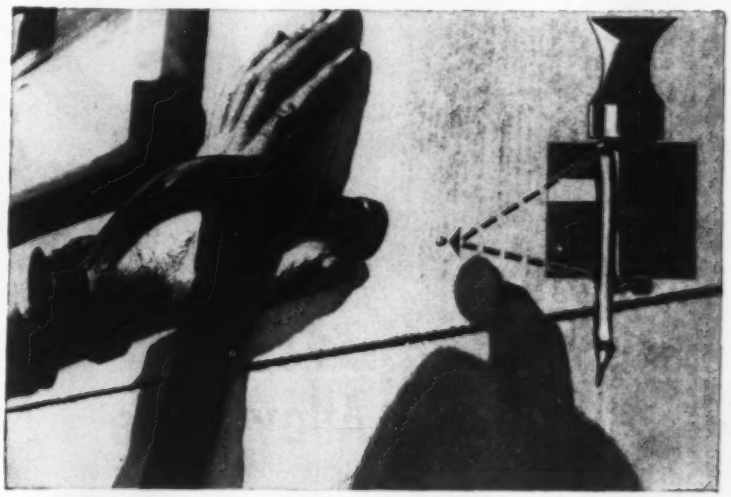
Tin Plate . . .

Tin Plate Prices, 136

Pittsburgh — Full tin mill product production schedules through rest of year are indicated. Efforts of customers to obtain increased tonnage allotments are unsuccessful. There likely will not be much change in consumer preference as to grades for fourth quarter. Use in beer cans and fruit juice containers continues to increase. Some easing in demand for coffee containers is noted but specifications for motor oil and dog food containers are little changed. Customers' stocks are not unusually large.

ES Trade Mark* nail

the amazing new self-locking fastener



This picture illustrates how the self-clinching face nail attaches asbestos shingles to gypsum and insulation sheathing. Inset shows, in cross section, the self-clinching principle. The fastener head is flattened, which in turn, by automatic action, causes the locking foot to be drawn up behind the sheathing.

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ELASTIC STOP NUT CORPORATION OF AMERICA

MADE OF MicroRold® STAINLESS STEEL STRIP

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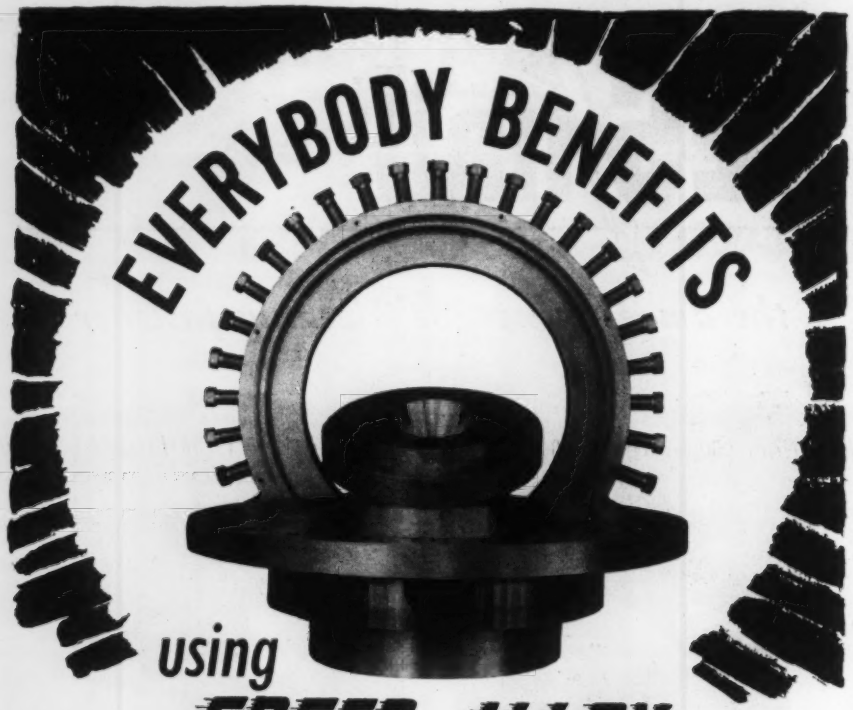

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1 PURCHASING AGENT — Benefits from its availability (plates up to 72" wide and 6" thick) and the fact that it can be purchased flame cut to specified dimensions on a net weight basis, for rectangular plate necessary, making his job easier. Speed Alloy — newest of the SPEED STEELS — is economical from every angle.

2 TOOL & DIE MAKER — Benefits because Speed Alloy is easy to machine — as easy as any machinery steel — and he can get more work done faster. Tool life is longer. Less finishing time is required. Speed Alloy heat treats uniformly and holds its dimensions to extremely close tolerances. Can be welded when necessary.

3 DIE SHOP REPRESENTATIVE — Benefits because he is assured of pleased customers — "Time Saver" Speed Alloy provides economies that enables him to bid lower. Not a kick in a car load. Speed Alloy bridges the gap between carbon and tool steels. Its chromium and molybdenum content qualify it for tough jobs.

4 TOOL AND DIE SHOP'S CUSTOMER — Benefits by faster delivery (because of savings in machining time) lower costs, and quality moldings with fewer rejects. Indiana Foundry, Machine & Supply Co., Brazil, Ind., made the plastic extruding die above, using all three grades of Speed Steel plates, for General Plastics Corp., Marion, Ind., to extrude Tenite sheets 40" wide in thickness from .010 to .060. Different thicknesses are obtained by merely changing the outside die ring. Complete die weighs 2000 lbs. Get the facts — Bulletin 905.

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Peninsular Steel Co. Detroit, Mich.
Pidgeon-Thomas Iron Co. Memphis, Tenn.
Horace T. Potts Co. Philadelphia - Baltimore

Wire . . .

Wire Prices, Page 137

Boston — Demand has broadened. More products go under allocation Oct. 1. Exceptions include wire rope, springs, music wire and light mesh. Some larger producers are operating on 30-day lead time against a normal 45 days and October schedules close Sept. 15.

Birmingham—Users are asking for more wire and wire products than they can get. Larger distributors have no nails and little fencing. In some specifications on manufacturers' wire orders can't be filled before well into next year.

Steel Bars . . .

Bar Prices, Page 135

Cleveland — Heavy tonnage carryover into fourth quarter will limit the volume of steel bars available for new business in the period. Customer allotments have been reduced and further reduction is likely in event military needs necessitate such action. So far direct and indirect military requirements account for only a small proportion of total bar tonnage but volume is rising. Alloy bars are in increasingly short supply, especially nickel alloys. Cold-finished bar producers are in a tight position because of inability to obtain all the hot bars they need.

Strong tone prevails in the market pricewise. Effective Aug. 31 the Steel & Tube Division, Timken Roller Bearing Co., Canton, O., increased prices on most products approximately 5 per cent.

New York—In an effort to conserve nickel and chrome, alloy bar sellers are beginning to push items which originally appeared as national emergency steels in World War II—steels that conserve nickel and chromium by greater use of molybdenum. Some of these, such as the 8600 and 8700 series, were made standard for peacetime application and it is these which are being offered as substitutes for certain other alloys. In fact, some producers are now definitely refusing to quote the higher chrome nickel steels for some purposes.

Cold drawn carbon bar orders are being accepted in increasing volume for first quarter. Meanwhile, producers of hot carbon bars have not opened books for shipment beyond December, causing some cold drawers to move somewhat slowly in accepting first quarter business.

Boston — Although subject to change, beginning Dec. 1 some mills are setting up schedules allowing for certain percentages of alloys to meet expected increase in armaments. Revisions are expected in carbon schedules with few openings available in fourth quarter.

Philadelphia — Carbon bar sellers are sold up for the year, but are having to find space for an increasing amount of emergency work at the expense of commercial commitments. To date emergency work is relatively small percentagewise.

Pittsburgh — Alloy bar producers have reviewed order acceptances for October scheduling and beyond with the object of obtaining customers' permission to substitute lower nickel

specifications under 2 per cent or straight chrome-moly grade. Most producers have not altered September schedules, but growing nickel shortage has prompted such action for fourth quarter. Cold finishers have ample hot-rolled material to sustain two shift operations and are booked through 1950 in most instances.

Chicago—Production of bars is expected to be curtailed this week if the unauthorized walkout of hookers, loaders and cranemen at the Gary Works, Carnegie-Illinois, continues. Billet losses last week averaged about 3000 tons a day. Bar mills were operated on inventory.

Tubular Goods . . .

Tubular Goods Prices, Page 138

Boston—With stocks depleted and unbalanced, merchant pipe allocations for November are being taken in full. Quotas for that month approximate October volume. Most producers are sold out on direct shipments through this year. Utilities are sounding out prospects for 1951 tonnage.

Plates . . .

Plate Prices, Page 135

New York—Stringency in plates is pronounced, particularly the light gages required for various tank work, pipe line, and freight car construction. The bulge in the latter is particularly noticeable. Plate producers have little tonnage available for remainder of this year, exceptions being some shipments offered by high premium producers and those able to work in rollings where substantial fabrication is to be had.

Boston—Efforts of plate fabricators to strengthen inventories meet with limited success. Producers are seeking to dry up outlets to gray markets with district sales offices policing distribution.

Philadelphia—Stringency in plain carbon plates, especially light gages, has stepped up pressure for floor plates for substitution.

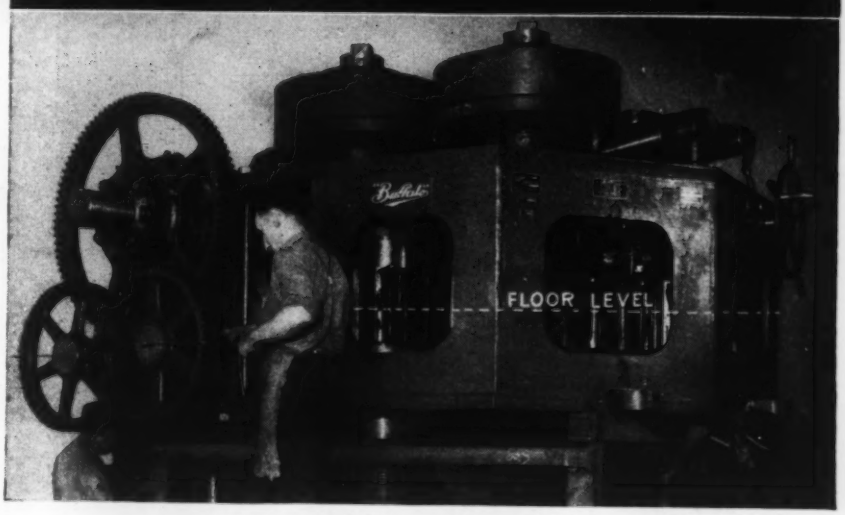
Cleveland—Plate buyers report increasing difficulty covering needs through remainder of the year. Producers are virtually sold out, especially in the lighter gages, into first quarter of next year and with railroad car requirements beginning to be felt severe shortages threaten. Hopes of the consuming trade for averting serious scarcities in the months ahead are pinned on the possibility some of the continuous sheet mills may be converted to production of light plates.

Chicago—One of the most readily obtainable steel products until recently has been floor plates. However, with carbon plates in particularly critical supply and oversold, normal demand plus substitution demand has squeezed floor plate producers and distributors until little of this product is available for prompt delivery.

Seattle—Acute scarcity of plates is handicapping shops which are interested in government contracts. No outstanding projects involving plates are pending.

You'll "MAKE ENDS MEET" in your HEAVY BENDING OPERATIONS

with "Buffalo" BENDING ROLLS



Machine is driven thru a speed reducer below floor level. Gearing above is for the third roll adjustment, which is also motor driven.

You may not wish to bend a perfect circle, say 108" in diameter, out of 8 x 8 x 1 angle, with both ends meeting. You may wish to turn out arcs, spirals, segments or special shapes. The "Buffalo" No. 4 Bender handles all these with a profitable accuracy and speed that assures "making ends meet"—and then some. Leg-in or leg-out angle bending—pipe, tubes, flats, rounds, channels, beams handled easily. Quickly changed rolls—no forms or dies required. Complete range of sizes for lighter work also. Write for BULLETIN 352-B and investigate this cheapest method of bending metal.

"Buffalo" MACHINE TOOLS

BUFFALO FORGE COMPANY

158 Mortimer St. Buffalo, New York

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

DRILLING — PUNCHING — CUTTING — SHEARING — BENDING

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 135

Chicago—Proposed construction is running afoul of the tight steel situation. Contractors are trying to beg or borrow reinforcing steel from other jobs. Recent inquiry for steel for two Milwaukee school jobs brought forth no bids because specifications called for delivery out of stock.

Los Angeles—Fabricators with fat work backlogs, but with stocks of steel being depleted faster than mills are replenishing, are taking longer looks at invitations to bid. Prices on state construction contracts are rising and fewer bids are received on each job. Highway building costs have risen 13½ per cent since Korea.

Seattle—Bar mills in this area are operating at capacity. Order backlogs are large and new demand steady. Buyers insist on quick delivery.

Structural Shapes . . .

Structural Shape Prices, Page 135

Boston — Fabricated structural steel contracts placed in New England in the first eight months, to Sept. 1, totalled approximately 55,000 tons. This is exclusive of steel contracts placed by district contractors for work outside the area. Small bridges account for the bulk of volume. Except in Connecticut where private construction is mounting, including a hotel, Hartford, inquiry is down slightly. Deliveries on fabricated steel are extended well into first quarter, 1951, with some shops. Plain material supply is limited and prices for steel in place are firmer.

New York—Extended deliveries are restricting structural orders. Most shops hesitate to accept business for shipment before late first quarter; in some instances not even then. Shape supply is in increasing stringency, fabricating shop quotas being curtailed for fourth quarter and indications pointing to even less in first quarter. In addition to extended schedules uncertainties as to costs also are causing contractors to move cautiously. Featuring local work are 4650 tons placed for second section of the Alfred E. Smith housing development.

Philadelphia — Bridge demand is off, but commercial inquiry is fairly sustained and there are various schools and public institutional buildings up for figuring involving moderately good tonnage in the aggregate. Extended structural deliveries, due in part to stringency in shapes, is placing some damper on contracts.

Pittsburgh — Structural inquiries continue to rise. Inquiries from private sources show greatest percentage gain. Fabricators are more concerned with mill deliveries than prices as suppliers report prospect of further cut-backs in fourth quarter allotments due to growing commitments for military requirements. Fabricating shops are more selective in bidding.

Cleveland — Structural fabricators are making every effort to get in stocks of shapes before direct and indirect military demands cut severely into available supplies. However, little success is meeting their efforts since the mills already are committed months ahead and are allotting tonnage. Expectations are they may cut fourth quarter quotas further in event military and related needs come out in volume.

Los Angeles—Producers are flooded with inquiries ranging east to Pennsylvania and south to Tennessee, from fabricators pleading inability to get structurals will put them out of business. District structural order books for fourth quarter are filled.

Seattle — Fabricating plants are making the best of an acute shortage of materials, particularly wide flange beams from eastern mills. Items supplied by West Coast producers are tighter. New commitments are limited to tonnage available.

Stainless Steel . . .

Stainless Steel Prices, Page 138

Pittsburgh — Nickel shortage may adversely affect stainless steel output next quarter. Some interests have maintained near record production through more extensive use of nickel scrap. The price for this scrap has doubled since first of the year, but supply is inadequate. Further reduction in nickel allotments by International Nickel Co. of Canada Ltd. is said to be possible. One stainless producer reports its nickel allotment cut about 50 per cent. Most sellers are booked through end of year on sheets, strip, wire and tubing.

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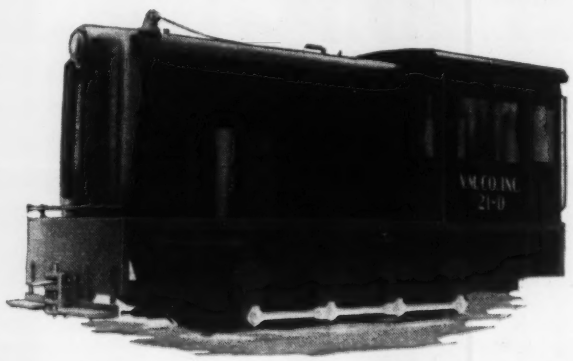

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Iron Ore . . .

Iron Ore Prices, Page 139

Cleveland—Lake Superior iron ore shipments declined to 12,482,069 tons in August from 12,703,591 tons in July, but showed an increase of 1,167,141 tons over the August, 1949, movement, reports the Lake Superior Iron Ore Association. Total shipments for first eight months were 46,783,863, decrease of 10,478,098 tons from the 57,246,961 tons moved in the like 1949 period. Only two ports, Escanaba and Michipicoten, accounting for 7.78 per cent of this season's movement, shipped more ore than a year ago.

Pig Iron . . .

Pig Iron Prices, Page 134

New York—With the vacation season over and steadily increasing demand for castings, foundries expect to consume more pig iron than at any other time so far this year. Consumption has increased in each consecutive month for some time past.

Boston—Foundry melt is up slightly. Pipe foundries are more active but pressure for iron is not strong, due partly to the known stock held by Mystic furnace at Everett. Prices for gray iron castings average higher.

Buffalo — Civilian consumers are getting the major portion of current merchant iron output, but a pickup is noted in government work here. The scramble for iron has gained momentum, many buyers asking for tonnage beyond immediate requirements. Pressure for stock has left little tonnage available for the East. This season's movement of iron down the barge canal is negligible.

Philadelphia—The larger of two stacks at Swedeland, Pa., is expected to be taken off shortly for what the operators hope will be minor repairs. This will further tighten pig iron supply in this district.

Pittsburgh—Merchant foundry iron supply is inadequate to meet stepped-up foundry production schedules. The unbalanced demand-supply relationship is expected to be further accentuated as the production tempo increases to meet military requirements. Most foundries have been forced to increase the proportion of scrap in melting operations. They are buying substantial tonnages of foreign iron. Merchant iron distribution is on a virtual allotment basis. Sellers are not making commitments more than a month ahead.

Cleveland — Merchant iron sellers are booking new business cautiously, seeking to distribute available supplies as equitably as possible. While no shortage is reported, supplies are noticeably tighter under impact of demand for increasing foundry operations and melters' efforts to stockpile. Some of the foundries are using a larger percentage of scrap in their melts and this trend is likely to accelerate as military requirements put more and more burden on available pig iron supply.

Cincinnati—Foundries are increasing their orders for pig iron for September shipment, but voluntary quotas by furnaces likely will bring little, if any, more tonnage than in recent months. Melters are active and expanding schedules by increasing the proportion of scrap in melts.

St. Louis—Pressure for pig iron is growing as foundry demand increases and high scrap prices turn iron consumers to increased pig ratio in melts. Foundries' order backlogs are increasing. Melters are appealing for larger quotas from blast furnaces. Inquiries for iron from far outside this territory are numerous.

Birmingham—Regular furnace customers are getting preference as pig iron supply becomes tighter. Merchant melters are besieged with inquiries. Republic Steel Corp.'s No. 2 furnace remains down due to coke shortage but Woodward Iron Co. has returned its No. 3 stack to the active list after relatively minor repairs.

Coal Chemicals . . .

Coal Chemical Prices, Page 133

Pittsburgh — Producers have advanced prices on toluol and industrial xylol 1.25 to 5 cents per gallon. U. S. Steel Corp. quotes, cents per gal, one degree toluol: Clairton, Pa., 25; Cleveland, 27.75; Lorain, O., 26; Gary, Ind., and Joliet, Ill., 28; Fairfield, Ala., 25; Geneva, Utah, 21. Revised quotations for industrial xylol are: Clairton, 26; Cleveland, 29; Lorain, 27; Gary and Joliet, 29.50; Fairfield, 26.25; and Geneva, 21 cents. Jones & Laughlin Steel Corp. quotes 25 cents for one degree toluol at aliquippa, Pa., and Pittsburgh; 29 cents for industrial xylol at both points; and 30 cents for pure benzol.

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See page 11

WHAT'S THE MOST ECONOMICAL WAY?
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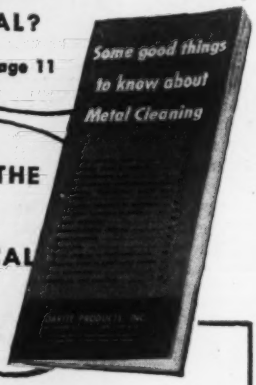

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Scrap . . .

Scrap Prices, Page 142

Pittsburgh — Stabilization efforts last week appeared working out. The market on No. 1 heavy melting appeared firmly established at $44 at which level a representative tonnage was purchased the week preceding. Last week No. 2 heavy melting sold at $41 and No. 2 bundles at $39. These prices represented advances over those recently prevailing, reflecting mills' efforts to restore normal grade price differentials. The mills have tightened up on specifications, insisting grade qualities be adhered to. Brokers are experiencing some difficulty purchasing No. 1 heavy melting at $43 to fill $44 orders. Weakness in industrial No. 1 heavy melting has spread to the similar railroad grade, the latest list being awarded within a range of $45 to $46, off $2.50.

Philadelphia — Market on No. 1 heavy melting steel and No. 1 bundles has been stabilized at $39-$39.50, delivered, depending upon freight rates. Mill orders were placed at this range. No. 1 busheling is up $1 to $38; short shovel turnings, to $33. Heavy turnings are higher at $39; knucklers and couplers and steel car wheels, at $45-$46. No. 1 machinery cast and clean auto cast have been advanced to $43-$44; malleable, to $50-$51.

New York—Brokers' buying prices of steel scrap have steadied at least for the present, all major grades holding unchanged. Foundry cast grades, however, are definitely stronger with No. 1 cupola cast up to $33-$34, fob shipping point; No. 1 machinery cast, $35-$36, a $3 increase in each instance. District foundries are in receipt of a substantially larger volume of orders and are actively competing for scrap.

Buffalo—Buying interest in scrap is dull as mill consumers refuse to bid at current price ranges. Dealers report, however, unprocessed material is moving from their yards on old orders. The cast market is at a standstill. The aloof position taken by mill consumers reflects the assurance that goes with liberal reserve stocks, augmented considerably by water receipts.

Chicago—Determined effort by mills to lower scrap prices paid off last week. Mills were able to buy No. 1 heavy melting at $40, No. 2 heavy melting at $38, and No. 2 bundles at $34. Neglected by mills for some time, No. 2 bundles are expected to be in better demand from now on. Prices paid for turnings cover a wide range. A price of $28 for short shoveling turnings is expected to set the pattern, however. Low phos is stronger at $52.50. Cast scrap prices are steady. Mills are paying $41.50-$42 for No. 1 railroad heavy melting.

Detroit—Considerable confusion exists among brokers and dealers over the "stabilized" prices in effect. In general the move is welcomed despite need for clarification of shipping points, springboards, differentials, etc. No. 1 bundles are quoted $38.50, off $2.50. Other grades are unchanged.

Cleveland—Scrap market has been

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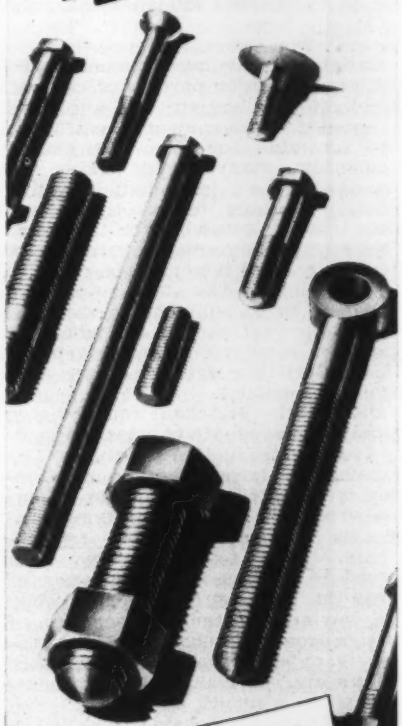

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stabilized here on the basis of $41-$41.50 for heavy melting steel. Light business is being done in the Valley at a comparable price level, $43.50-$44. Material is moving freely and in good volume with brokers still filling old orders. There is no evidence of a break in the stabilization program.

Cincinnati — Heavy melting steel scrap price is off $2 at $41, a reflection of melters' efforts to stabilize the market. Bidding for September needs reflects this mill attitude. The market is quiet. Foundry grades are unchanged, with demand active. Scrap supplies are fair.

St. Louis — Foundry demand for cast scrap continues to gain after last week's spurt. Poor shipments to dealers tightened supplies. Cast prices are largely unchanged. No. 2 heavy melting steel and No. 2 bundles prices are $1 higher. Railroad specialties are $3 lower.

Birmingham—Strong upward tendency in the scrap continues, especially cast grades. All foundries are running at virtual capacity. No. 2 melting steel scrap is quoted at $32, although some tonnage was sold above that figure to Atlantic Steel Co., Atlanta, Ga.

Los Angeles — Speculative buying has accented uncertainty. Punchings and plate scrap, now $44.80, is up $12.80. Prices of other steelmaking grades registered more moderate gains, up $1 to $2. No. 1 cupola cast at $42.50 is encountering resistance.

Seattle—Steel scrap is arriving at mills in increased tonnage though recent price advances have not resulted in plentiful receipts. Sellers are shipping more freely. Scrap from British Columbia is subject to export licenses. Inventories remain static.

Warehouse . . .

Warehouse Prices, Page 139

Chicago — Warehouse operators think they will fare better under any formal allocation plan than they did at outset of World War II. They feel they finally have been able to get across to government officials the essential function they perform. It is impossible for warehouses to build up satisfactory inventories under present circumstances. Consumers have a hard time believing the biggest distributors are completely out of some products. But sheets and plates, particularly, never go into inventory, moving out as quickly as checked in.

Cleveland—Consumers find it increasingly necessary to shop around for supplies as warehouse stocks steadily shrink. Although distributors are booking new business cautiously, turning away considerable tonnage from outside the district and limiting orders as far as possible to regular customers, their inventories are severely depleted.

Boston — Procurement in fourth quarter is of major concern to warehouses with stocks depleted and allocations smaller. Demand on warehouses is heavy.

Philadelphia — Local warehouses broke all sales records for the year in August, despite increasing gaps in inventories.

Pittsburgh—Shipments from warehouse stocks in August were com-

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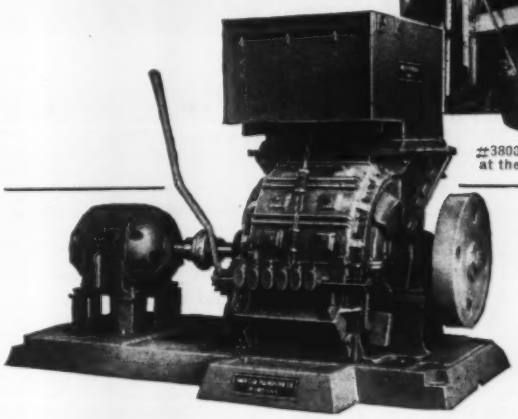
Metal turnings reduced to uniform chips by an American #3800 Crusher are collected for oil reclamation at the Link-Belt Co.'s Ewart Plant, Indianapolis.



Reduced into uniform chips by American shredder ring action, long, curly turnings of steel, aluminum, brass etc. release valuable cutting oil much more freely—30 to 50 gallons per ton! Add the savings in storage and handling—plus the higher scrap value of short shoveling turnings—and it's easy to see why Americans pay for themselves . . . over and over again.

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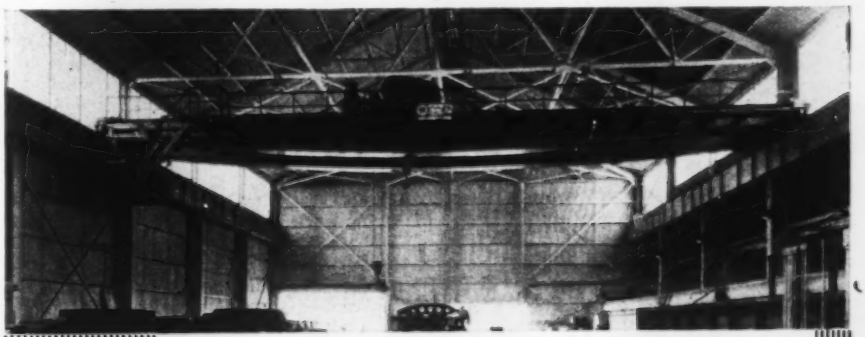

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parable with the preceding month and little change is indicated for September.

Cincinnati — Distributors doubt if stocks will be adequate to support sales this month at the August rate. Inventories are out of balance, with sheets and plates critically scarce. Building steel is in short supply.

Los Angeles—Even August sales, up 20 to 50 per cent over July's peaks, are not enough to keep warehousemen happy. Mill deliveries are lengthening and are too erratic to keep distributors' inventories balanced.

Seattle — Warehouse volume has reached the year's peak to date, stimulated by war psychology and the decision to proceed with many delayed projects. One house reports August volume 238 per cent over May.

Rails, Cars . . .

Track Material Prices, Page 137

Philadelphia—Pennsylvania railroad has awarded 214 diesel-electric locomotives costing approximately $55 million. The diesels will increase the road's fleet of this type to 1034, with a total of 1,943,510 horsepower.

Birmingham — Southern Pacific Railroad has allocated to the Bessemer plant of Pullman-Standard Car Mfg. Co. an additional 1600 box cars, making a total of 4600 cars on order from that railroad at the Bessemer plant.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

4650 tons, section 2, Alfred E. Smith housing development, Manhattan, New York, to Harris Structural Steel Co., that city.

3500 tons, Lever House office building, Park avenue between 53rd and 54th streets, New York, to Bethlehem Steel Co.

3300 tons, 60th street tunnel construction, City Board of Transportation, New York, to American Bridge Co., Pittsburgh.

2300 tons, bridge, Delaware River Bridge Commission, Trenton, N. J., through Dravo Contracting Co., Pittsburgh, to American Bridge Co., that city.

1240 tons, 15-story office building, 41st street and Broadway, New York, to Harris Structural Steel Co., that city.

1200 tons, Safeway store, Kearney, N. J., to Bethlehem Steel Co.

1000 tons, No. 40, New Jersey turnpike, to Bethlehem Steel Co.

850 tons, nine state bridges, Danvers-Middleton-Topsfield and Boxford, Mass., to Bethlehem Steel Co.; Savin Construction Corp., Hartford, Conn., general contractor.

775 tons, section, Market street subway, between 42nd and 46th streets, Philadelphia, through Buckley & Co., that city, general contractor, to Bethlehem Steel Co.

552 tons, No. 56, New Jersey turnpike Hudson county, through George M. Brewster & Son Inc., Bogota, N. J., to American Bridge Co., Pittsburgh.

350 tons, W. T. Grant store, Norfolk, Va., to Bethlehem Steel Co.

340 tons, warehouse, American Sugar Refining Co., New Orleans, to Virginia Bridge Co., Roanoke, Va.

315 tons, office building, East 43rd street, New York, to Dreier Structural Steel Co. Inc., Long Island City, N. Y.

270 tons, Sacred Heart building, Hempstead, N. Y., to Bethlehem Steel Co.

250 tons, telephone building, Spokane, Wash., to Bethlehem Pacific Coast Steel Corp., Seattle.

110 tons, Jewish Center of High Bridge, Nelson avenue and East 168th street, Bronx.

New York, to Grand Iron Works Inc., that city.

STRUCTURAL STEEL PENDING

2600 tons, state I-beam bridges, Beaver county, Pennsylvania; bids Sept. 29.

1600 tons, state bridge, Charles river, Boston; bids Sept. 26, Boston.

1200 tons, Washington state Cowlitz river truss bridge; bids to, Olympia, Sept. 26.

700 tons, power plant, Western Massachusetts Electric Co., West Springfield, Mass.; Stone & Webster Engineering Corp., Boston, engineer-contractor.

500 tons, warehouse, Pennsylvania Sugar Co., Philadelphia; bids in.

395 tons, No. 51, New Jersey turnpike, Bergen county, bids Sept. 19; also 15,100 feet of cast-in-place concrete piles.

370 tons, buildings, Marywood College, Scranton, Pa.; bids closed Sept. 6.

250 tons, mechanical engineering building, Penn State College, State College, Pa.; originally in the market some months ago, again up for bids Sept. 13.

Unstated, three 60-foot transmission towers, south substation, Seattle light department; second call Sept. 13.

Unstated, hangar, 200x350 feet, International Airport, Anchorage, Alaska; Lytle-Green Co., Seattle, low $481,370.

Unstated, second phase Chief Joseph dam; bids to U. S. Engineer, Seattle, Nov. 2.

Unstated, 710-foot girder span, Yakima river, Washington; jointly by U. S. Engineer, Atomic Energy Commission and Benton county; bids soon.

REINFORCING BARS . . .

REINFORCING BARS PLACED

1000 tons, unstated construction for Atomic Energy Commission center in Idaho, to Bethlehem Pacific Coast Steel Corp., Seattle.

300 tons, Catholic hospital addition, Aberdeen, Wash., to Truscon Steel Co., Portland, Oreg.; General Construction Co., Seattle, general contract.

300 tons, miscellaneous small private construction projects, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

3200 tons, second stage construction, Chief Joseph dam; bids to U. S. Engineer, Seattle, Nov. 2.

800 tons, approaches, Washington state Cowlitz river bridge; bids to Olympia, Sept. 26.

149 tons, No. 51, New Jersey turnpike, Bergen county; bids Sept. 19.

100 tons, West canal, Columbia Basin project; bids to Bureau of Reclamation, Denver, in September.

Unstated, second unit University of Washington student union building, Henrik Vallee, Seattle, apparently low $933,259.

Unstated, 2400 feet 27 to 30 inch reinforced concrete sewer pipe; bids to Lake City, Wash., Sept. 11.

Unstated, 7-story addition Good Samaritan Hospital, Portland, Oreg.; bids called Sept. 22.

PLATES . . .

PLATES PLACED

5000 tons, water supply line, Medford, Oreg., to Consolidated Western Steel Corp., Los Angeles, $890,854. This item was previously reported as involving 500 tons.

100 tons or more, elevated water tank, Taylorville, Ill., to Chicago Bridge & Iron Co., Chicago, $104,560.

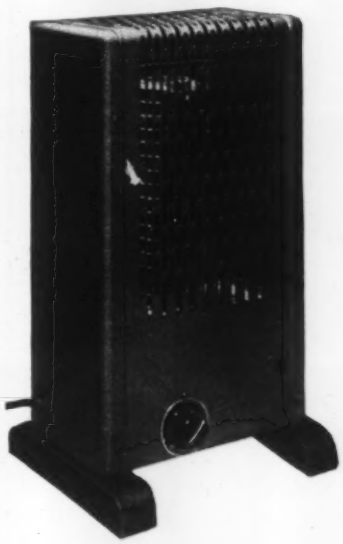
Unstated, youth service center, Seattle; J. C. Boespflug Co., Seattle, low base $795,327.

PLATES PENDING

500 tons of hull steel, principally plates, for three 1600-hp tugs for Reading Railroad.

Unstated, two elevated storage tanks, 150,000-gal. each; bids to Atomic Energy Commission, Idaho Falls, Idaho, Sept. 7.

Unstated, 17,200 feet steel piling, Washington state Cowlitz river bridge; bids to Olympia, Sept. 26.



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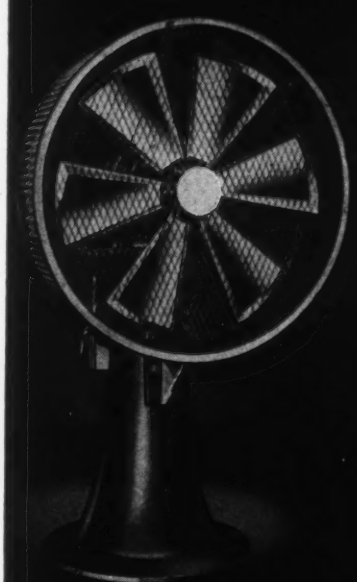

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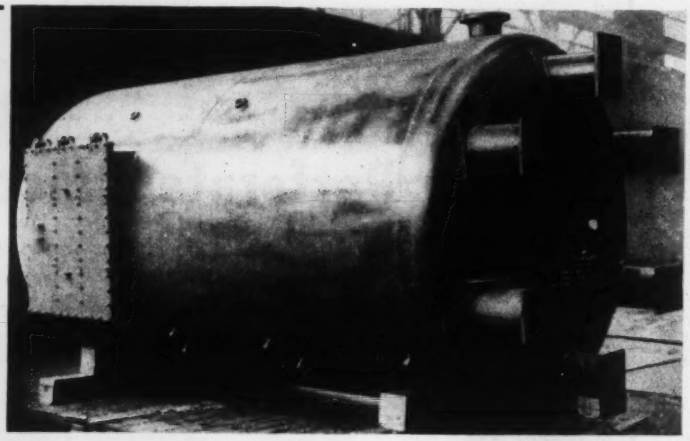

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THE RIGHT BALL

Let Strom Help You

Not only in precision ball bearings, but in countless other places, Strom has found that the right ball will do the job better. Maybe your problem can be solved with the use of the proper ball. Why not take it up with Strom.

Strom has been making precision metal balls for over 25 years for all industry and can be a big help to you in selecting the right ball for any of your requirements. In size and spherical accuracy, perfection of surface, uniformity and dependable physical quality, there's not a better ball made.

Strom STEEL BALL CO.
1850 So. 54th Ave., Cicero 50, Illinois
Largest Independent and Exclusive Metal Ball Manufacturer

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Unstated, 6600 feet, Grandview, Wash., system improvement, to Armco Drainage & Metal Products, Co., Portland, Oreg., low $17,915.

STEEL PIPE PENDING

6925 tons, 14 inch, seamless or electric welded, Pier No. 1, East Boston, Mass.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Pennsylvania, 214 diesel locomotives, placed with five manufacturers: Electro-Motive Division, General Motors Corp., La Grange, Ill.; American Locomotive-General Electric Companies, Schenectady, N. Y.; Fairbanks, Morse & Co., Chicago; Lima-Hamilton Corp., Lima, O.

Clinchfield, twelve 1500-hp general purpose diesel-electric units to Electro-Motive Division, General Motors Corp., LaGrange, Ill.

Georgia, four 1500-hp general purpose diesel-electric locomotives, to Electro-Motive Division, General Motors Corp., La Grange, Ill.

Santa Fe, 20 diesel-electric locomotives, comprising ten 1600-hp road switchers placed with Fairbanks, Morse & Co., Chicago, and ten passenger units, placed with Electro-Motive Division, General Motors Corp., La Grange, Ill.

RAILROAD CARS PLACED

Baltimore & Ohio, 1000 seventy-ton gondolas, to Bethlehem Steel Co.

Chicago, Rock Island & Pacific, 850 freight cars, comprising 500 flat cars, to its own shops, and 350 fifty-ton box cars to General American Transportation Co., Chicago.

Fruit Growers Express, 1100 refrigerator cars, 1000 forty-ton units going to the Pacific Car & Foundry Co., Seattle, and 100 fifty-ton units to its own shops.

Lehigh Valley, 200 seventy-ton gondolas, to Bethlehem Steel Co.

Northern Pacific, 500 fifty-ton box cars to own shops at Brainerd, Minn.; 500 forty-foot box cars, 100 covered hopper cars and 50 steel cabooses are contemplated for construction at the Brainerd shops upon completion of their recently placed box car orders; also 250 gondolas will be either purchased or built at the Brainerd shop.

Pacific Fruit Express, 2100 refrigerator cars, to its own shops.

St. Louis, San Francisco, ten 50-ton flat cars, to American Car & Foundry Co., New York.

RAILROAD CARS PENDING

Pennsylvania, 5000 freight cars; purchase under consideration.

RAILS PENDING

Pennsylvania, 100,000 tons of rails, plus or minus 40 per cent, for laying next year; bids close Sept. 14.

FERROALLOYS

(*Continued from Page* 139)

Foundry Ferrochrome: (Cr 62-66%, C 5-7%). Contract, c.l., SMxD, bulk, 22.0c per lb of contained Cr, c.l., packed 22.9c, ton 24.25c, less ton 26.0c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-72%). Contract, carload, lump, bulk, max. 0.03% C 31.85c per lb of contained Cr, 0.04% C 29.75c, 0.06% C 28.75c, 0.10% C 28.25c-28.5c, 0.15% C 28.0c, 0.20% C 27.75c, 0.50% C 27.5c, 1% C 27.25c, 1.50% C 27.1c, 2% C 27.0c. Carload packed add 1.1c, ton lot add 2.2c, less ton add 3.9c. Delivered. Spot, add 0.25c.

"SM" Low-Carbon Ferrochrome: (Cr 62-66%, Si 4-6%, Mn 4-6%, C 0.75-1.25% max.). Contract, carload, lump, bulk 27.75c per lb of contained chromium, carload, packed 28.85c, ton lots 30.05c, less ton 31.85c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome, Nitrogen Bearing: Add 5c to 0.10% C low-carbon ferrochrome prices for approx. 0.75% N. Add 5c for each 0.25% of N above 0.75%.

Chromium Metal: (Min. 97% Cr and 1% Fe). Contract carload, 1" x D; packed, max 0.50% C grade, $1.03 per lb of contained chromium,

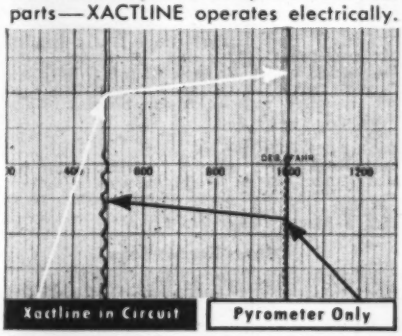
Automatic

"STRAIGHT-LINE"
TEMPERATURE CONTROL
with
XACTLINE

ELIMINATE
Overshooting
Undershooting

Are you going to continue to put up with that troublesome overshooting and undershooting inherent in your conventional pyrometer control — especially when it is so easy to eliminate that saw-tooth effect?

Put XACTLINE in the control circuit. XACTLINE anticipates the temperature changes — before they occur. And too, it nullifies the varying amounts of thermal lag, residual heat, and mechanical lag — producing a short on-off cycle resulting in "Straight-Line" temperature control. This performance is possible because there is no dependence upon mechanical parts — XACTLINE operates electrically.



Exact reproduction of temperature chart for a heating process showing the comparison of the "Straight-Line" temperature control produced by XACTLINE and the saw-tooth curve obtained with only conventional control.

XACTLINE is applicable to any indicating or recording pyrometer control of the millivoltmeter or potentiometer type. It should be used wherever close temperature control is required — any type of electrically heated oven, furnace, kiln, injection molding machine, and fuel-fired furnaces equipped with motor-operated or solenoid valves.

XACTLINE is a complete unit. No adjustment or coordination with the control instrument is required regardless of the size of the furnace, length of the heating cycle, or size of the load. Installation is very simple — can be either flush or surface mounted.

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Specialists for 36 Years in the Heat Treating and Temperature Control Field

Dept. 14 • 3000 South Wallace St., Chicago 16, Ill.
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ton lot $1.05, less ton $1.07. Delivered. Spot, add 5c.

Silicon Alloys

25-30% Ferrosilicon: Contract, carload, lump, bulk, 17.00c per lb of contained Si; packed 18.40c; ton lot 19.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 11.3c per lb of contained Si, carload packed 12.9c, ton lot 14.35c, less ton 16c. Delivered. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max.) Add 1.3c to 50% ferrosilicon prices.

75% Ferrosilicon: Contract, carload, lump, bulk, 13.5c per lb of contained Si, carload packed 14.8c, ton lot 15.95c, less ton 17.2c. Delivered. Spot, add 0.8c.

80-90% Ferrosilicon: Contract, carload, lump, bulk, 14.65-15.0c per lb of contained Si, carload packed 15.9c, ton lot 16.9c, less ton 18.05c. Delivered. Spot, add 0.25c.

Low-Aluminum 85% Ferrosilicon: (Al 0.50% max.). Add 0.7c to 85% ferrosilicon prices.

90-95% Ferrosilicon: Contract, carload, lump, bulk, 16.5c per lb of contained Si, carload packed 17.7c, ton lot 18.65c, less ton 19.7c. Delivered. Spot, add 0.25c.

Low-Aluminum 90-95% Ferrosilicon: (Al 0.50% max.). Add 0.7c to above 90-95% ferrosilicon prices.

Silicon Metal: (Min. 97% Si and 1% max. Fe). C.l. lump, bulk, regular 19.0c per lb of Si, c.l. packed 20.2c, ton lot 21.1c, less ton 22.1c. Add 1.5c for max. 0.10% calcium grade. Deduct 0.4c for max. 2% Fe grade analyzing min. 96% Si. Spot, add 0.25c.

Alsifer: (Approx. 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 7.65c per lb of alloy, ton lots packed 9.05c, 200 to 1999 lb 9.40c, smaller lots 9.90c. Delivered. Spot up 0.5c.

Briquetted Alloys

Chromium Briquets: (Weighing approx. 3¾ lb each and containing exactly 2 lb of Cr). Contract, carload, bulk, 13.75c per lb of briquet, carload packed 14.45c, ton lot 15.25c, less ton 16.15c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx. 3 lb and containing exactly 2 lb of Mn). Contract, carload, bulk 10.45c per lb of briquet, c.l. packaged 11.25c, ton lot 12.05c, less ton 12.45c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx. 3½ lb and containing exactly 2 lb of Mn and approx. ½ lb of Si). Contract, c.l. bulk 10.30c, per lb of briquet, c.l. packaged 11.1c, ton lot 11.9c, less ton 12.8c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing exactly 2 lb of Si). Contract, carload, bulk 6.15c per lb of briquet, c.l. packed 6.95c, ton lot 7.75c, less ten 8.65c. Delivered. Spot, add 0.25c.

(Small size—weighing approx. 2½ lb and containing exactly 1 lb of Si). Carload, bulk 6.30c, c.l. packed 7.10c, ton lot 7.90c, less ton 8.80c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each) 95.00c per pound of Mo contained, f.o.b. Langeloth, Pa.

Calcium Alloys

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%.) Contract, carload, lump, bulk 19.25c per lb of alloy, carload packed 20.05c, ton lot 21.55c, less ton 22.55c. Delivered. Spot add 0.25c.

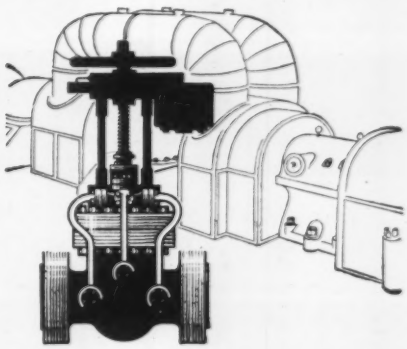
Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.50-3%). Contract, carload, lump, bulk 17.9c per lb of alloy, carload packed 19.1c, ton lot 21.0c, less ton 22.5c. Delivered. Spot add 0.25c.

Titanium Alloys

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max., Si 4% max., C 0.10% max.) Contract, ton lots 2" x D, $1.40 per lb of contained Ti; less ton $1.45. (Ti 38-43%, Al 8% max., Si 4% max., C 0.10% max.) Ton lot $1.28, less ton $1.35, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $167 per net ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C



high pressure and high temperature

Not so many years ago, designers shunned gray iron for high pressure and high temperature usage. This is all changed — such castings are now freely specified.

Molybdenum has made possible this type, and many other types, of high quality cast iron.

Some high pressure steam valves are made of cast iron containing 3.10% Total Carbon, 2.45% Silicon, 0.75% Manganese with 0.75% Molybdenum added. This composition, and hundreds of other examples of the economical application of Molybdenum cast iron, are to be found in our new booklet, "Applications of Molybdenum Cast Irons". Write for it!

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Capacities 50 tons up

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PITTSBURGH (23), PA.

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For many years, "HERCULES" (Red-Strand) Wire Rope has been proving its outstanding quality by the accurate yardstick of performance — on all sorts of tough jobs. Such *consistent* performance is not a matter of chance. Design... rigid tests and inspections... equipment... firm standards — are essential factors.

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3-4.5%.) Contract, $183 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

Vanadium Alloys

Ferrovanadium: Open-hearth Grade (Va 35-55%, Si 8-12% max., C 3-3.5% max.). Contract, any quantity, $2.90 per lb of contained Va. Delivered. Spot, add 10c. **Crucible-Special Grades** (Va 35-55%, Si 2-3.5% max., C 0.5-1% max.), $3. **Primos and High Speed Grades** (Va 35-55%, Si 1.50% max., C 0.20% max.) $3.10.

Grainal: Vanadium Grainal No. 1, 93c per lb; No. 6, 63c; No. 79, 45c, freight allowed.

Vanadium Oxide: Contract, less carload lots $1.20 per lb contained V_2O_5, freight allowed. Spot, add 5c.

Tungsten Alloys

Ferrotungsten: (70-80%). Contract, 10,000 lb W or more, $2.25 per lb of contained W; 2000 lb W to 10,000 lb W, $2.35; less than 2000 lb W, $2.47. Spot, add 2c.

Tungsten Powder: (W 98.8% min.). Contract or spot, 1000 lb or more, $2.90 per lb of contained W; less than 1000 lb W, $3.

Zirconium Alloys

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, Fe 40-45%, C 0.20% max.). Contract, c.l., lump, bulk 6.6c per lb of alloy, c.l. packed 7.35c, ton lot 8.1c, less ton 8.95c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max.). Contract carload, lump, packed 20.25c per lb of alloy ton lot 21c, less ton 22.25c. Freight allowed. Spot, add 0.25c.

Boron Alloys

Ferroboron: (B 17.50% min., Si 1.50% max., Al 0.50% max., C 0.50% max.). Contract, 100 lb or more, 1" x D, $1.20 per lb of alloy. Less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices 100 lb and over are as follows: Grade A (10-14% B) 75c per pound; Grade B (14-18% B) $1.20; Grade C (19% min. B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si), $4.25 per lb contained B, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Bortam: (B 1.5-1.9%). Ton lots, 45c per lb; smaller lots, 50c per lb.

Carbortam: (B 1 to 2%) contract, lump carloads 9.50c per lb, f.o.b. Suspension Bridge, N. Y., frt allowed same as high-carbon ferrotitanium.

Other Ferroalloys

Ferrocolumbium: (Cb 50-60%, Si 8% max., C 0.4% max.). Contract, ton lot, 2" x D, $3.50 per lb of contained Cb, less ton $3.55. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb and Ta 60% min., C 0.30 max.) ton lots, 2" x D, $2.67 per lb of contained Cb plus Ta, delivered; less ton lots $2.72.

CMSZ Mixes: (No. 4—Cr 45-49%, Mn 4-6%, Si 18-21%, Zr 1.25-1.75%, C 3-4.5%; No. 5—Cr 50-56%, Mn 4-6%, Si 13.50-16.0%; Zr 0.75-1.25%, C 3.50-5%). 12 M x D, carload packed 19.0c per lb of material, ton lot 19.75c, less ton 21.0c. Delivered.

Silcaz Alloy: (Si 35-40%, Ca 9-11%, Al 6-8%, Zr 3-5%, Ti 9-11%, B 0.55-0.75%). Carload packed, 1" x D, 43c per lb of alloy, ton lot 45c, less ton 47c. Delivered.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, carload, packed, ½" x 12 M, 16.5c per lb of alloy, ton lots 17.50c, less ton 18.5c. Delivered. Spot, add 0.25c.

Graphidox No. 4: (Si 48-52%, Ca 5-7%, Ti 9-11%). C.l. packed, 17.0c per lb of alloy; ton lots 18.0c; less ton lots 19.50c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed, 14.25c per lb of alloy; ton lots 15.75c; less ton lots 17.00c, f.o.b., Niagara Falls, N. Y.; freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al). Lump, bulk, carload 11.00c. Ton lots, bulk 11.50c, packed 11.75c. Less ton lots, packed 12.25c per lb of alloy, f.o.b. Philo, O., with freight not to exceed railroad freight allowed to destination.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $3 for each 1% of P above or below the base); carloads, f.o.b. seller's works, Mt. Pleasant, or Siglo, Tenn., $65 per gross ton.

Ferromolybdenum: (55-75%). Per lb, contained Mo, f.o.b. Langeloth and Washington, Pa., furnace, any quantity $1.13.

Technical Molybdic-Oxide: Per lb, contained Mo., f.o.b. Langeloth and Washington, Pa., packed in bags containing 20 lb of molybdenum, 95.00c.

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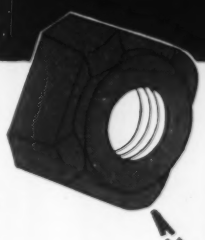
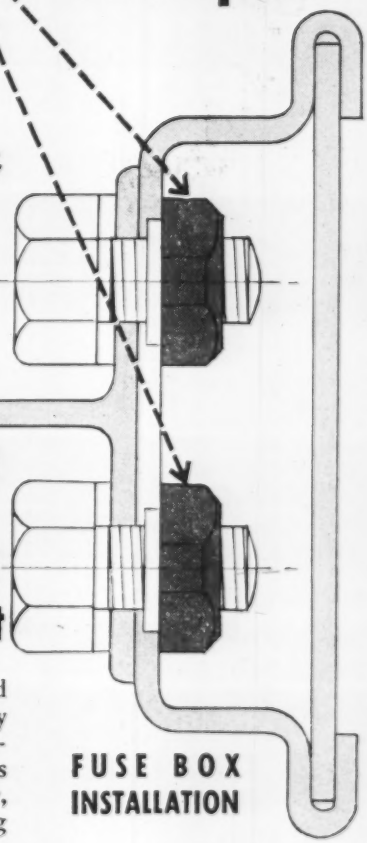


SIMPLIFY *attachment of* **metal parts**

Here's Another "Blind Spot"



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Permanently welded in place as shown by this drawing, Midland Welding Nuts make attachment easy, simply by turning bolts into the Midland Nuts. The result will be as strong as the metal itself. Midland Welding Nuts stay put!

If you have similar production problems let's discuss the possibility of using Midland Welding Nuts to save time and money and speed production.

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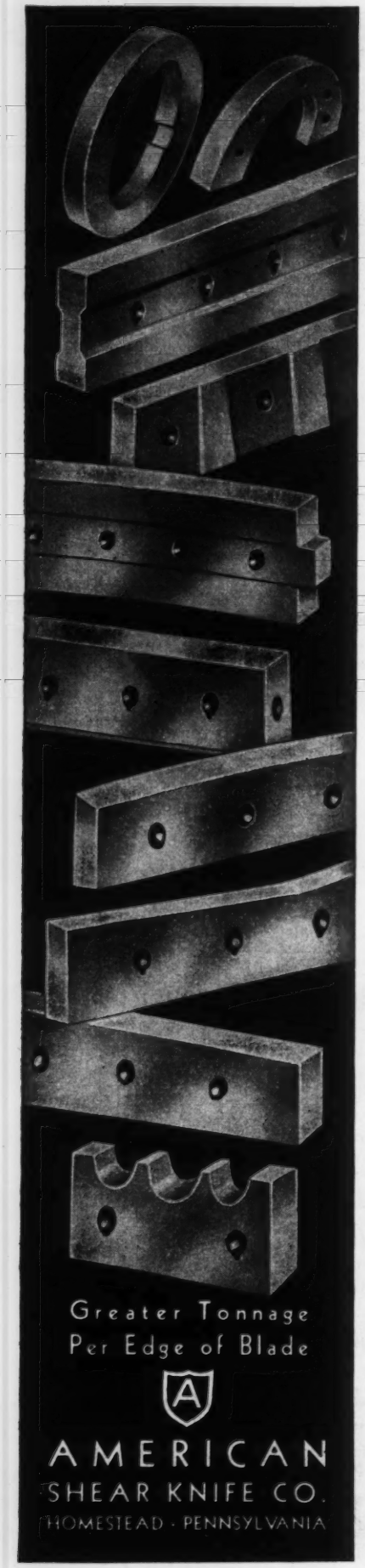

Metalworking Briefs

CONSTRUCTION, ENTERPRISE
ORGANIZATIONAL CHANGES

California

Universal Form Clamp Co., Chicago, maker of prefabricated concrete forms, is planning construction of a $200,000 plant in Oakland, Calif., next year.

California

Chase & Sanborn Division, Standard Brands Inc., New York, started an expansion of its San Francisco plant. A $100,000 addition will be added to the plant and $250,000 of production equipment will be installed.

California

United States Spring & Bumper Co., Los Angeles, purchased Fether & Co., Santa Clara, Calif., and will operate it as its Brake Division. The latter will continue manufacture of brake linings.

California

B. F. Goodrich Co., Akron, started construction of a $300,000 warehouse addition to its Los Angeles tire and tube plant.

Delaware

Gilman Corp.—steel and metal products—was chartered by the secretary of state's office, Dover, Del. Capital of the firm is listed at $100,000. Corporation Trust Co., Wilmington, Del., is serving as the principal office.

Delaware

Robbins Machine & Mfg. Co.—machinists—filed a charter of incorporation with the secretary of state's office, Dover, Del. Corporation Service Co., Wilmington, Del., is serving as the principal office.

Delaware

American Flange & Mfg. Co. Inc.—machinery—was chartered by the corporation department, secretary of state's office, Dover, Del. Capital of the firm is listed at $2.1 million. Prentice-Hall Corporation System Inc., Dover, is serving as the principal office.

Illinois

Westcott Chuck Co., Oneida, N. Y., appointed Norman Durrie Sales Co., Chicago, as its representative in northern Illinois, northern Indiana, eastern Iowa, eastern Wisconsin, and the upper peninsula of Michigan.

Illinois

Trabon Co., Chicago, changed its name to Kordell Industries Inc. The company manufactures core oils and chemicals and is a manufacturers' agent for foundry supplies.

Kentucky

Sandy Valley Tool & Machine Co., Paintsville, Ky., is constructing a plant at West Van Lear, Ky., for the manufacture of wrenches.

Maryland

Alexander Milburn Inc., manufacturer of oxyacetylene cutting and welding apparatus, moved to new headquarters at 1231-45 Ridgely St., Baltimore. The corporation's entire manufacturing and sales operations will be carried on from this address. New and modern equipment of all types will be installed. W. L. Lawrence is president of the firm.

Massachusetts

H. E. Dickerman Mfg. Co., Springfield, Mass., manufacturer of dies, jigs, feeds, etc., completed a 5000 square feet addition to its plant at 321 Albany St.

Mississippi

Hercules Powder Co., Wilmington, Del., awarded a contract to H. K. Ferguson Co., Cleveland, for the construction of a plant at Hattiesburg, Miss., for the production of toxaphene, a chlorinated camphene insecticide. Work will start immediately on the $1.5 million project which is scheduled to be completed by February, 1951.

Missouri

Wabash Railroad plans construction of a new railroad freight yard in the vicinity of North Market, Branch Hall and First streets, St. Louis, to serve a big wholesale produce market being constructed in that section. The yards would cost about $1 million. Also involved would be the construction or relocation of several grade crossings.

New York

Teall Mfg. Co. received approval from the town of Penfield, N. Y., for rezoning of a site on Washington street where the firm plans to build an $85,000 factory for the production of small machine parts.

New York

Ward Tool & Machine Co. Inc., Buffalo, was incorporated by Milton Rabow, Helen B. Lash, Frank Pitterman and Goodwin Rosen.

New York

Beals, McCarthy & Rogers Inc., steel warehouse firm, moved to its new $750,000 headquarters on South Park Ave., Buffalo. The old building in downtown Buffalo will be torn down. The firm has been in operation for more than a century.

New York

Cleveland Chain & Mfg. Co., Cleveland, appointed A. P. Hendricks Co., 78 Reade St., New York, as its factory sales representative in that territory.

New York

W. C. Cowden Machinery Corp. moved into new offices and showrooms at 1207 W. Genesee St., Syracuse, N. Y. It formerly was located at 146 Harding Pl., that city.

New York

Ajax Flexible Coupling Co. Inc., Westfield, N. Y., appointed as representatives: Samson Sales Co., San Francisco; Thurlow Equipment Division, G. Donald Bradley Co., Seattle; Boyd Goodhart, Kansas City, Mo.

Ohio

Eaton Screw Products Co., Eaton, O., was incorporated to manufacture and deal in machines of all kinds, tools, etc. Incorporators are: Arthur F. Zalud, Edgar P. Stocker, W. D. Ginn and Robert C. Barnd, statutory agent.

Ohio

Art-Mil Machine & Mfg. Inc., Columbus, O., was incorporated to manufacture and deal in machines, machinery, tools, engines, etc. Incorporators are: James N. Buccalo, Andrew J. White Jr., statutory agent, and Edward I. Miller.

Ohio

Wilson-Elbrecht Co., Minneapolis, opened a branch plant on Prospect

FERRACUTE PRESSES
Complete line. Mechanical power presses 32 to 500 tons. Since 1883.
FERRACUTE MACHINE CO., *Bridgeton, N. J.*

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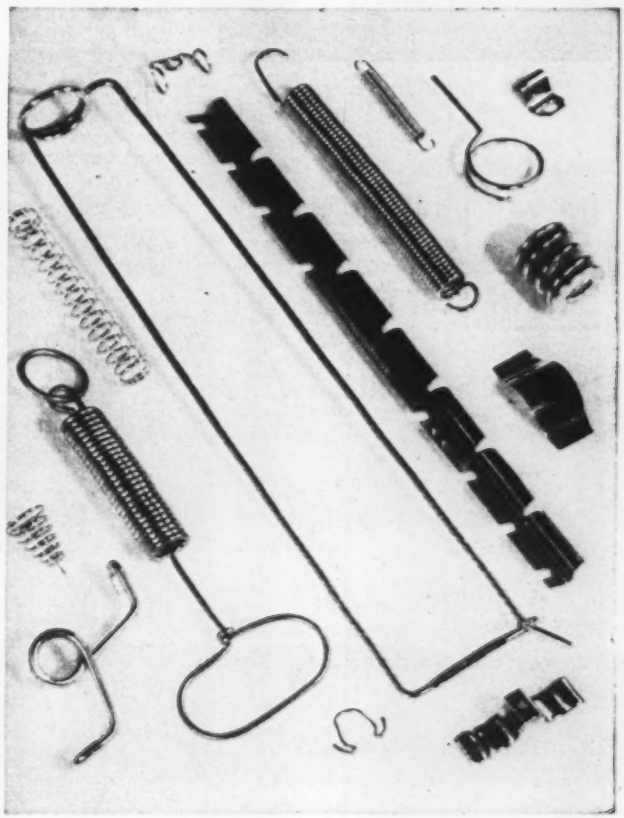

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